

ABSTRACT

Spatial and temporal variation of habitat relations and genetic variation in *Elephas maximus maximus* were studied in Maduru Oya National Park Sri Lanka with the objectives of studying the distribution of elephants in different habitats, population structure, spatial and temporal variations of food habits and genetic differentiation within and among the population of elephants in MONP. Various methodologies were adopted such as line transect method, microhistological faecal analysis, habitat analysis and genetic analysis. Six different habitat types were identified using recent satellite images and ground data. Using direct and indirect methods, elephants were found to be occupying in different habitats in varying degrees. Seasonal variation in habitat use was evident accompanied by a selective preference for grasslands and scrublands in dry and wet seasons respectively. Population composition of the elephants indicated that the age structure in Maduru Oya consisted of 44.12% adults (Males and females) 28.39% sub adults, 18.26% juveniles and 8.50% calves with a clear adult dominated structure. Maduru Oya elephants were observed to form small herd sizes with an average herd size of 3.8. The herd size also varied in different habitat types and during seasons. A large number of male bachelor herds were recorded in MONP. Food habits of the elephants in MONP, using quadrat data, direct observations and microhistological faecal analysis revealed 20 plant species belonging to 12 families including woody, shrub and grass species. *Panicum maximum* followed by *Cynodon dactylon* were the most frequently consumed grass species, while *Bauhinia racemosa* was the most frequently consumed tree species throughout the year. Food habits of elephants in Maduru Oya were influenced by season and habitat while their diet was dominated by browse in both dry and wet season. Genetic variations of elephants were studied using DNA extracted from dung, followed by quantification, dilution, PCR, gel electrophoresis and analysis of sequencing data of DNA, in three identified populations namely Maduru Oya, Wasgamuwa and Udawalawa. A total of 11 haplotypes were identified with a total haplotype diversity of 0.881. Nine of these haplotypes were restricted to Maduru Oya elephant population which has not been recorded elsewhere. While 2 haplotypes were observed to be shared with Udawalawa National Park, none of the haplotypes were shared with Wasgamuwa National park depicting a hindrance to gene flow from Wasgamuwa to Maduru Oya. In MONP, elephant habitats could be enriched to improve grazing opportunities for the elephants and early successional fires

• before the rain, would stimulate growth of new grass which is preferred by elephants. Further studies must be carried out to access the genetic structure of elephants in and around Maduru Oya National Park.