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Ethno-veterinary practices in Southern India for captive Asian elephant ailments

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ABSTRACT

Ethenopharmacological relevance: India has a long tradition of practicing Ayurvedic medicine not only for human ailments, but also for the management of livestock in the form of ethno-veterinary practices. Asian elephant is a significant part of Indian culture, and ethno-veterinary practices have extended to manage and cure various ailments of Asian elephant in captivity. Much of this knowledge has been lost in the light of modern practices.

Aim of the study: This study is aimed at documenting the existing knowledge on ethno-veterinary medicines practiced by elephant keepers (*mahouts*) in Tamil Nadu and Puducherry.

Materials and methods: The study was carried out between June 2015 and February 2016 employing a questionnaire survey among 50 selected informants (*mahouts*) with traditional knowledge on plants in veterinary medicine. Information was elicited from the informants on various diseases prevailing among captive elephants and the traditional treatment employed by them.

Results: In total, the study documented 53 plant species belonging to 29 families being used as medicine for 23 types of ailments prevailing among captive elephants. *Ferula assa-foetida, Zingiber officinale, Piper longum, P. nigrum, Cuminum cyminum, Trachyspermum roxburghianum* and *Carum bulbocastanum* were the most commonly used plants either independently or in combination. Among them, *Ferula assa-foetida* (12.4%) and *Zingiber officinale* (10.4%) had the highest usage. Of the 23 diseases reported, constipation was the most common ailment (14.6%) followed by bloating (8.7%) and flatulence (8.7%).

Conclusion: Documentation of this indigenous knowledge is valuable for the communities concerned, both at present and in future and for scientific consideration for wider use of traditional knowledge in treating captive elephants. The study has identified 53 medicinal plants to treat various ailments among captive elephants in southern India. The most frequently used plants in the captive elephant health care practice are *F. assafoetida, Z. officinale, P. longum* and *P.nigrum*. Among the 29 families, Apiaceae and Piperaceae are widely used. The leaves are the most useful part of the plants, while paste is the widely used form of preparation. The present findings show that mahouts have wide knowledge about elephant diseases and their treatment using herbal medicine. A more detailed investigation should be designed on priority to document the dying art of ethno-veterinary practices for the long-term conservation of the Asian elephant.

1. Introduction

India has a strong tradition of medicinal background in the form of Ayurveda to treat human ailments, and also to manage livestock in the form of ethno-veterinary practices. Animals play a vital role in the culture and many societies regard them as being equal in status to humans (Raikwar and Maurya, 2015; Sheikh et al., 2013; Saikia et al., 2006; Hebbar et al., 2004). Traditional healing practices have been followed for centuries and passed down orally from generation to generation (Abbasi et al., 2013; Shang et al., 2012; Yineger et al., 2007; Somvanshi, 2006). In India, traditional veterinary science was employed even during the period of *Mahabharat*, an epic narrative of the Kurukshetra War (3067 BCE) between two rival princes—*Kaurva* and Pandava, in which thousands of animals including elephants were

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seriously injured and many suffering from various diseases were treated with medicinal plants (Somvanshi, 2002, 1993). Indian medical treatises like Charaka, Sushruta and Harita samhita carry references to care of animals (Somvanshi, 2006).

The Asian elephant (*Elephus maximus*) is considered an integral part of the culture and mythology of India and elsewhere in Asia. Tamil Nadu, a southern state of India, manages about 200 elephants in captivity (Vanitha et al., 2010a; Vanitha, 2007) at Timber camps, zoos, and religious places, such as Hindu temples, mutts, trusts, charitable institutions, mosques and by individual owners. The Government of Tamil Nadu has classified the elephants into three different captive systems, namely, Forest Department Captive Elephants, Temple Elephants and Private Elephants (Vanitha et al., 2011a; Vanitha, 2007). All these, except the elephants owned by the elephant keeper (*mahouts*), are meant for daily rituals in religious places such as Hindu temples and mosques, with limited work and are mostly idled, whereas those owned by the *mahouts* are used mostly on contract basis for commercial purposes (Vanitha et al., 2010b).

Captive animals in general are not fed strictly and maintained in accordance with their nutritional requirements. This is especially true with captive elephants managed in zoos (Crandall, 1964), private and temple systems (Vanitha et al., 2008; Krishnamurthy, 1998; Gokula, 1993). Some captive facilities feed their elephants with monotonous fodder round the year without any variation in diet (Vanitha et al., 2008). The captive elephants, except those at timber camps, are managed in artificial environment without sufficient quantity and quality green fodder, and other supplementary diets, inadequate exercise (Vanitha et al., 2010b), and in isolation from conspecifics (Vanitha et al., 2011a). These elephant thus often encounter many physical (Vanitha, 2007), physiological and psychological health issues (Vanitha et al., 2016). Therefore, these elephants are in need of more systematic veterinary care for their upkeep, and for immunization to protect from infectious diseases. All the domesticated elephants in India do not get adequate veterinary support. The captive elephants managed at zoos and in timber camps by State Forest Department receive better care than others (Vanitha, 2007). A large number of domesticated elephants, particularly those under private and temple systems, do not get modern veterinary care and the elephant keepers depend on *kaviraj* (practitioners of traditional medicine), quacks or on their own knowledge (Bist et al., 2002). In fact, expert elephant veterinarians are a rarity in the country. Besides inadequate laboratory support, veterinarians who are specialized in elephant diseases are sometimes inadequate (Vanitha et al., 2009; Vanitha, 2007).

Veterinary science in India is classified under ethnoveterinary medicine and has a documented history of around 5000 years; codified knowledge has existed in the form of manuscripts on various aspects of veterinary care. Widespread interest in documenting and validating ethno-veterinary practices has developed in the early 1980s. Since then, several studies related to ethno-veterinary practices have been carried out in Himalayas (Bhatta et al., 2013; Tiwari and Pande, 2010), Uttar Pradesh (Sheikh et al., 2013; Kumar and Bharati, 2013; Ali, 1999), West Bengal (Shah et al., 2010; Das and Tripathi, 2009), Assam (Saikia and Borthakur, 2010; Saikia, 2006), Rajasthan (Rao et al., 2014; Mehta et al., 2012; Upadhyay et al., 2011), Gujarat (Kathiriya et al., 2012; Jadeja et al., 2006), Orissa (Mallik et al., 2012; Satapathy, 2010), Maharashtra (Somkuwar et al., 2015; Kulkarni et al., 2014; Gadpayale et al., 2014; Wath and Jambu, 2014), Andhra Pradesh (Lakshminarayana and Narasimharao, 2013), Karnataka (Raveesha and Sudhama, 2015), Kerala (Vijayakumar et al., 2015; Kaladevi and Preetha, 2015; Thomos et al., 2011), Tamil Nadu (Parthiban et al., 2016; Dhanam and Elayaraj, 2014; Santhivimalarani and Pavadai, 2014; Muhamed Mubarek et al., 2012; Selvaraju et al., 2011).

Foot-and-Mouth Disease (FMD) is common disease among cattle in the study area (Parthiban et al., 2016) and has been rarely reported among captive Asian elephant (Vanitha, 2007; Sharma et al., 1994; Ramiah, 1935). The mortality of the captive elephant due to helminthic parasitic infection is also significant in Tamil Nadu (Vanitha et al., 2011b, 2010a). In such a situation, owing to the scarcity of allopathic veterinary medicines, traditional *mahouts* diagnose and treat their elephants using indigenous plant-based medicines. Unlike in the past, where mahoutry was considered as a proud profession of a specialized class of people, it has now lost its charm owing to the lack of remunerative salaries and other economic benefits, as also poor welfare measures in view of the dwindling importance of captive elephants (Vanitha et al., 2009). Significant part of the art of herbal treatment history has already been lost without systematic investigation. Documenting existing knowledge on herbal treatment, which has limited side effects, unlike the chemical-based treatment prevailing at present, is vital. This paper is an attempt to gather information on the present status of ethno-veterinary practices followed by the *mahouts* of temples and private elephants managed in Tamil Nadu and Puducherry states, India.

2. Materials and methods

2.1. Study area

The present study was carried out between June 2015 and February 2016 surveying 16 districts of Tamil Nadu and Puducherry (Fig. 1). The general geological formation of these districts is plain and they lie on the coastal zone, with Cauvery and its tributaries being the major rivers. Agriculture and fisheries are the primary activities of people in these districts. Many temples traditionally use one or two captive elephants to perform daily rituals to the deity, blessing devotees for a few hours in the morning and evening, and participating in occasional temple-festival processions. These elephants are not allowed to breed for religious reasons and are usually bought from the Tamil Nadu Forest Department. Unruly elephants are reverted to the Forest Department (Vanitha et al., 2010b; Vanitha, 2007).

2.2. Methodology

The survey was conducted following questionnaire survey interviewing 50 selected informants (elephant *mahout*) having traditional knowledge (3–45 years of experience) on folk veterinary medicines, following standard ethno-botanical investigations (Jain, 1964, 1995, 1999). The questionnaire allowed descriptive responses on various ailments including *musth*, a physiological phenomenon, prevailing among captive elephants in the study area, the plant taxa name, and their parts used (leaves, latex, seeds, fruits, bulbs, stem, bark, husk and entire plants), mode of preparation (decoction, paste, powder and juice) and form of use (fresh or dried), ingredients (other plants used), and route of application (oral and external). A sample of plant specimens were collected and preserved following systematic herbarium procured for taxonomic confirmation with experts. The collected plant specimens were identified by taxonomic experts at the Department of Botany in A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai, India, and also verified with the published literatures (Kirtikar and Basu, 1993; Nair and Mohanan, 2005). Similarly, the collected information on elephant ailments was converted/ translated into medical terms following literatures (Sarma, 2009; Chandrasekaran et al., 2009; Alex, 2009; Stremme et al., 2007; Fowler and Mikota, 2006).

2.3. Data analysis

The data on frequency of various ailments (the number of times these ailments were prevalent among captive elephants during the last one year period and reported by the interviewees), frequency use of plant species for each ailment (frequency of a given plant species used for a particular ailment) and overall frequency use of plant species (frequency of a given plant species used irrespective of ailments) were