

INTRODUCTION

Arthropod-borne viruses, i.e., *Arboviruses*, are the causative agents of some of the most important emerging infectious diseases and are responsible for significant global health problems (Gubler, 2001) and also severe economic loss to the society. The genus *Alphavirus* is one of the two genera within the family *Togaviridae* and *Chikungunya virus* (CHIKV) is an *alphavirus*, the most important human pathogen, which has caused numerous outbreaks of arthritic disease in people since it was first isolated in 1953 (Jupp and McIntosh, 1988). The virus spread through mosquito bite. In India the CHIK outbreak was first reported in 1963 in Kolkata followed by Chennai, Pondicherry and Vellore in 1964; Vishakhapatnam, Rajahmundry, Kakinada and Nagpur in 1965 and Barsi in 1973 (Yergolkar *et al.*, 2006). After a gap of 32 years CHIKV reemerged in India causing severe morbidity (Yergolkar *et al.*, 2006). During the recent outbreak, the Andhra Pradesh was the first state to report CHIKV epidemic in December 2005 and one of the worst affected states in Indian subcontinent (Ravi, 2006). By the end of 2006 nearly 1.39 million people were affected and about 565.42 million people were at the risk of infection (Krishnamoorthy *et al.*, 2009). In India CHIKV affected nearly 23 states/union territories from 2005-2011 with millions of people affected (NVBDCP, 2012). Rural hospitals and clinics (both public and private), were flooded with victims of chikungunya. CHIKV inflicted considerable pain and misery and caused substantial and unexpected local, regional and national financial burden towards healthcare (Kalantri *et al.*, 2006). It took several weeks to months for the patients to recover from the illness and lead back to normal pattern of life. Disability adjusted life years (DALY) is an

appropriate summary measure of population health to express epidemiological burden of disease. National burden of chikungunya was estimated to be 25,588 DALYs lost during 2006 epidemic, with an overall burden of 45.26 DALYs per million (Krishnamoorthy *et al.*, 2009).

An another Arbovirus, belonging to the genus *Orbivirus* in the family *Reoviridae*, ***Bluetongue virus*** (BTV) is the most important animal pathogen which has the potential to cause Bluetongue (BT) disease in the ruminants animals that can not only result in a high rate of mortality in sheep but can also in other ruminant species, including cattle and goats (McLaughlin and DeMaula 2003, Wilson *et al.*, 2007). The disease once continued to exotic imported sheep, now become established in native sheep of south India. The disease is being reported annually and is causing severe economic losses to the farmers. Bluetongue is very difficult to eradicate because of the involvement of *Culicoides*, multiple serotypes and broad host range. BT was first described in an imported Merino sheep in South Africa in the 19th century. In 1902, the disease was mentioned as “a malarial catarrhal fever of sheep” but was named as “bluetongue” in 1905. During the beginning of the 20th century, BT spread in Africa along with introduction of non indigenous sheep breeds that are highly susceptible to the disease (Monath *et al.*, 1996). BTV infection was subsequently recognized as an enzootic disease in areas between latitude 40° S and 53° N in almost all continents, i.e. America, Africa, Australia and Asia (Mellor *et al.*, 1995) causing worldwide losses that were estimated in 1996 at US\$ 3 billion per year (Tabachnick, 1996). Prior to 1998, occasional short-lived incursions of BTV occurred in southern Europe (Spain, Portugal, Greece and Cyprus) (Mellor *et al.*, 1995).

The first Outbreak of BT in India was recorded in 1964 among sheep and goats in Maharashtra State, on the basis of clinical signs and detection of BTV antibodies in the sera of animals which had recovered (Sapre, 1964). There are approximately 48.79 million sheep in India (Anon, 1988). Over the past three decades, several exotic breeds of sheep have been introduced into the country for cross breeding and improvement of indigenous stock. Thus, more susceptible sentinel animals for BTV are present now than in the early 1960s when the first outbreak of BT was noticed in Maharashtra State. Between 1961 and 1963, several outbreaks of BT occurred in indigenous as well as exotic sheep and goats in India. Since the initial report in 1964, several outbreaks of BT in indigenous, cross bred and exotic sheep have been reported on the basis of clinical signs and/or serology (Prasad *et al.*, 1992). Bluetongue was reported from different states including Uttar Pradesh (Bhambani and Singh, 1968), Himachal Pradesh (Uppal and Vasudevan, 1980), Haryana (Vasudevan, 1982), Karnataka (Srinivas *et al.*, 1982), Tamilnadu (Janakiraman *et al.*, 1991) Madhya Pradesh (Mehrotra *et al.*, 1996), Gujarat (Chauhan *et al.*, 2004), Bengal (Joardar *et al.*, 2009) and Andhra Pradesh (Rama Rao 1982, Sreenivasulu *et al.*, 1999 and Bommineni *et al.*, 2008).

Though once exotic to country now the viral infections like CHIK in humans and BT in sheep are more prevalent. Both Chikungunya fever in humans and Bluetongue disease in sheep and other ruminants became epidemic in the state of Andhra Pradesh. Therefore development of diagnostic methods either based on antibodies or viral genome detection would be useful for the rapid diagnosis of

these arboviral infections. In the present study we carried out reasearch work with the following title:

“Studies on Seroepidemiology, Comparative analysis of RICA and MAC-ELISA and Molecular Diagnosis of *Chikungunya virus* and also Studies on RT-PCR based Detection and Molecular Characterization of *Bluetongue virus* isolates from Andhra Pradesh.”