

## New species of *Anelosimus* (Araneae: Theridiidae) from Africa and Southeast Asia, with notes on sociality and color polymorphism

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### Abstract

The cobweb spider genus *Anelosimus* contains species showing various levels of social behavior. American *Anelosimus* are well known and several species have been described from Europe, China, Japan, and Madagascar. However, to date, only two behaviorally unknown species have been

described from continental Africa, Southeast Asia, and Australasia combined. In this paper we describe seven new *Anelosimus* species, *A. agnar* n. sp. (Malaysia), *A. biglebowski* n. sp. (Tanzania), *A. dude* n. sp. (Tanzania), *A. linda* n. sp. (Malaysia), *A. monskenyensis* n. sp. (Kenya), *A. nelsoni* n. sp. (South Africa), and *A. sulawesi* n. sp. (Sulawesi) from Africa and Southeast Asia. We also redescribe *A. kohi* Yoshida, 1993 and provide evidence for subsocial behavior in that species. *Anelosimus kohi* shows a marked color polymorphism that is apparently habitat-related, both in populations in Malaysia and in Singapore. Several of the undescribed species were included in previous phylogenetic analyses, and the likely phylogenetic placement of each species is discussed. Based on new behavioral information we discuss the phylogenetic and geographical distribution of temporary and permanent sociality in *Anelosimus*.

**Key words:** Cladistics, morphology, sociality, subsocial, taxonomy

## Introduction

The cosmopolitan cobweb spider genus *Anelosimus* Simon, 1891 (Theridiidae) is unique for the social behavior of nearly all its species. With species ranging from extensive maternal care (e.g. *A. pacificus* Levi, 1956, I. A. pers. obs), to temporary social, e.g. *A. arizona* Agnarsson, 2006 (see Avilés & Gelsey 1998; Bukowski & Avilés 2002; Powers & Avilés 2003) to permanently social, e.g. *A. eximius* (Keyserling, 1884) (for review see Avilés 1997) the genus plays an important role in understanding the evolution of sociality in spiders, and other animals (for reviews see Kullmann 1972; Buskirk 1981; Avilés 1997). Knowledge of *Anelosimus* species in different geographic regions is highly asymmetric (see distribution listings in Platnick 2005). New World species are intensely studied both taxonomically (Levi 1956, 1963; Agnarsson 2005, 2006) and behaviorally (reviewed in Avilés 1997). A number of species have been described from China and Japan (Bösenberg & Strand 1906; Yoshida 1986; Zhu 1998; Song *et al.* 1999), Europe (Walckenaer 1802; Koch 1836) and Madagascar and the Seychelles (Roberts 1983; Agnarsson & Kuntner 2005) including some basic behavioral observations on some of the species. However, to date only one species has been described from each of mainland Africa (see Miller 2004), and Southeast Asia (see Yoshida 1993), although based on limited sampling the genus is widespread in these areas and probably many species are yet to be discovered.

This paper describes seven new *Anelosimus* species from Southeast Asia (Malaysia, Singapore, Sulawesi) and Africa (Tanzania, Kenya, South Africa) based mostly on recently collected specimens. *Anelosimus kohi* Yoshida, 1993 from Singapore and Malaysia is also redescribed. The paper provides basic behavioral information on two of the species, and discusses a remarkable example of color polymorphism in *A. kohi*. The phylogenetic placement of each species is discussed based on both morphological (Agnarsson 2004, 2005, 2006), and preliminary molecular data (Agnarsson unpublished).