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## The aphrophorid spittlebugs of Iran (Hemiptera: Cercopoidea: Aphrophoridae)

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### Abstract

An annotated list of Aphrophoridae of Iran is provided, based on examination of specimens housed in the Hayk Mirzayans Insect Museum (Iran) and the National Museum of Wales, Cardiff (UK) and on previously published records. Ten species are now recorded from Iran. An identification key to the genera and species is provided, with illustrations and together with distributions. The subgenus *Philaenus* (*Gyrurus*) Tishechkin 2013 is recognized as a junior synonym of *Mesoptyelus* with *Mesoptyelus iranicus* (Tishechkin, 2013) as a new combination for *Philaenus* (*Gyrurus*) *iranicus* Tishechkin 2013. *Paraphilaenus notatus* (Mulsant & Rey, 1855) is recorded for the first time from Iran. *Philaenus nebulosus* Lethierry 1876 (currently *Poophilus nebulosus* (Lethierry, 1876)) is proposed to be a junior synonym of the widespread species *Poophilus costalis* (Walker, 1851).

**Key words:** froghoppers, fauna, Persia, new combination, new records

### Introduction

The Aphrophoridae and Cercopidae are the two largest families in the superfamily Cercopoidea and the only ones recorded from Iran. The Aphrophoridae (often known as froghoppers or spittlebugs) can be distinguished from Cercopidae by the lack of red and black patterns on the body, and with the head usually as broad as pronotum and with more or less parallel sides of pronotum (Emeljanov 1967; Holzinger *et al.* 2003). The family is distributed worldwide and found in most terrestrial habitats.

Like other families of the Cercopoidea, nymphs of Aphrophoridae secrete a frothy saliva-like mass, which gives the name “spittlebugs” for insects in the superfamily. The mass is made of the semi-digested fluid of the xylem discharged from the alimentary channel of the nymphs, combined with mucopolysaccharides and polypeptides produced by malpighian tubules (Mello *et al.* 1987; Rakitov 2002). The spittle mass protects nymphs against desiccation, predators and parasitoids (Cryan & Svenson 2010). However, there are still some natural enemies who can find them in the spittle masses (Peck & Thompson 2008). According to Yaghmaei (2008), the spittle mass on *Alhagi persarum* (camel’s-thorn), is used in Iranian traditional medicine and named Persian manna. Adult spittlebugs excrete small drops of water instead of spittle mass and their drab colors may support them against predators by camouflage (Peck & Thompson 2008).

Cercopoidea are considered as the largest group of xylem feeders (Thompson 2011), which are usually oligophagous or polyphagous insects (Owen 1988; Peck & Thompson 2008). A strong preference towards nitrogen fixing plants such as legumes has been detected in many species (Thompson 1994). They have been mentioned as pests with economic importance on rice, sugarcane, strawberry, alfalfa, perennial plants and some pasture plants etc. (Zajac & Wilson, 1984; Drosopoulos & Ashe, 1991; Wilson & Claridge 1991; Thompson 1994; Peck *et al.* 2001; Peck & Thompson 2008). The damage caused by spittlebugs on agricultural plants may consist of phytotoxemia, chlorosis, reduction of the plant growth, number of flowers and lateral branches, photosynthetic rate, biomass and fitness, modifying plant community structure and host population genetic structure destroying the pastures and soil degeneration (Parman & Wilson 1982; Peck & Thompson 2008; Carr & Eubanks 2002; Ivey *et al.*, 2004; Meyer & Whitlow 1992; Meyer & Root 1993; Cronin & Abrahamson 1999; Carson & Root 1999).