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SHORT COMMUNICATION

First reports of parental care in species of the genus *Dismegistus* (Hemiptera: Heteroptera: Parastrachiidae)

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Abstract. Parental care is reported in several insect orders. Usually, it involves protecting eggs, burying them, moving a batch of eggs from place to place and feeding the larvae. Insect parental care is well developed in Heteroptera and is particularly widespread in the superfamily Pentatomoidea. The species best known for their maternal care belong to the subfamily Sehirinae (Cydnidae) and the genus *Parastrachia* (Parastrachiidae). There are no published data on parental care in species of the genus *Dismegistus* (the second genus within the family Parastrachiidae). This paper provides the first reports of females of species of *Dismegistus* carrying and guarding egg batches in the same way as species in the genus *Parastrachia* and certain Sehirinae.

INTRODUCTION

Both male and female animals adopt various strategies to ensure the safe development of their offspring (Trumbo, 1996; Suzuki, 2013; Wong et al., 2013; Gilbert & Manica, 2015). One of the most important strategies is parental care; it usually includes protecting the eggs, burying them, carrying batches of eggs from place to place and feeding the larvae (Tallamy, 1984; Mas & Kölliker, 2008; Meunier et al., 2022). This behaviour is found, albeit rarely, in several insect orders, namely Coleoptera, Embioptera, Hymenoptera, Isoptera, Thysanoptera and Hemiptera (Tallamy, 1984; Mas & Kölliker, 2008; Meunier et al., 2022). Nevertheless, parental care is well developed in Heteroptera, where it is described in detail by Tallamy (1984), Tallamy & Schaefer (1997), and Goula (2008).

This phenomenon is widespread in the superfamily Pentatomoidea (Southwood, 1956; Kaitala & Mappes, 1997; Gogala et al., 1998; Filippi et al., 2001, 2009; Filippi & Nomakuchi, 2002; Hironaka et al., 2005; Kudo et al., 2006, 2021, 2024; Monteith, 2006; Mukai et al., 2010; Nakahira et al., 2013; Inadomi et al., 2014; Tsai et al., 2015) and also occurs in other heteropteran families (Southwood, 1956; Tallamy & Denno, 1981; Smith, 1997; Tallamy & Schaefer, 1997; Tallamy & Igaly, 2004; Guidoti et al., 2015; Kudo et al., 2024).

In many true bugs (Heteroptera), parental care starts before egg hatch (Southwood, 1956; Filippi-Tsukamoto et al., 1995; Kight, 1997; Kaitala & Mappes, 1997; Filippi et al., 2001, 2009; Agrawal et al., 2005; Monteith, 2006; Inadomi et al., 2014; Tsai et al., 2015; Filippi & Nomakuchi, 2022; Kudo et al., 2024).

In Pentatomoidea, the species best known for their parental care are those in the genus *Parastrachia* Distant, 1883 (Parastrachiidae) (Tachikawa & Schaefer, 1985; Filippi-Tsukamoto et al., 1995; Filippi et al., 2001; Hironaka et al., 2005; Filippi & Nomakuchi, 2022). In addition, females of species belonging to the subfamily Sehirinae also guard their eggs and are well studied (Southwood, 1956; Kight, 1997; Filippi et al., 2001, 2009; Sweet & Schaefer, 2002; Agrawal et al., 2005; Kudo et al., 2006; Mukai et al., 2010; Nakahira et al., 2013; Inadomi et al., 2014).

There is no published data on parental care in species of the genus *Dismegistus* Amyot & Serville, 1843 (the second genus within the family Parastrachiidae). However, there is photographic evidence of this phenomenon on internet forums, including iNaturalist (www.inaturalist.org), which is one of the most popular online sources for entomologists. This paper provides the first report of females of species of *Dismegistus* guarding egg batches in the same way as species of *Parastrachia* and certain Sehirinae.

MATERIAL ANALYSED

Dismegistus cf. *fimbriatus* (Thunberg, 1783)

SOUTH AFRICA: Western Cape, Cape Winelands, Wabooms-river, Wolseley, Latitude/Longitude: –33.48725, 19.28895, 2022-10-03, coll. F. Riegel, det. D.H. Jacobs (Figs 1–6).

There are also several additional records in iNaturalist: https://www.inaturalist.org/observations/152014765; https://www.inaturalist.org/observations/143496614; https://www.inaturalist.org/observations/62013059.

Dismegistus cf. *binotatus* (Westwood, 1837)

SOUTH AFRICA: Otters Den, an island in the Blyde River near Hoedspruit, Blyde riverine forest, Latitude/Longitude: –24.405, 30.814, 2013-12-19, coll. W. Uys, det. D.H. Jacobs (Fig. 7).

SOUTH AFRICA: Otters Den, an island in the Blyde River near Hoedspruit, Semi-deciduous riverine forest along Blyde River, Altitude 1600 ft, Latitude/Longitude: –24.405, 30.814, 2016-01-09, coll. W. Uys, det. D.H. Jacobs (Fig. 8).

Figs 1–6. Female of *Dismegistus* cf. *fimbriatus* carrying a batch of eggs (South Africa, Western Cape, Cape Winelands, Waboomsriver, Wolseley, photographer F. Riegel).

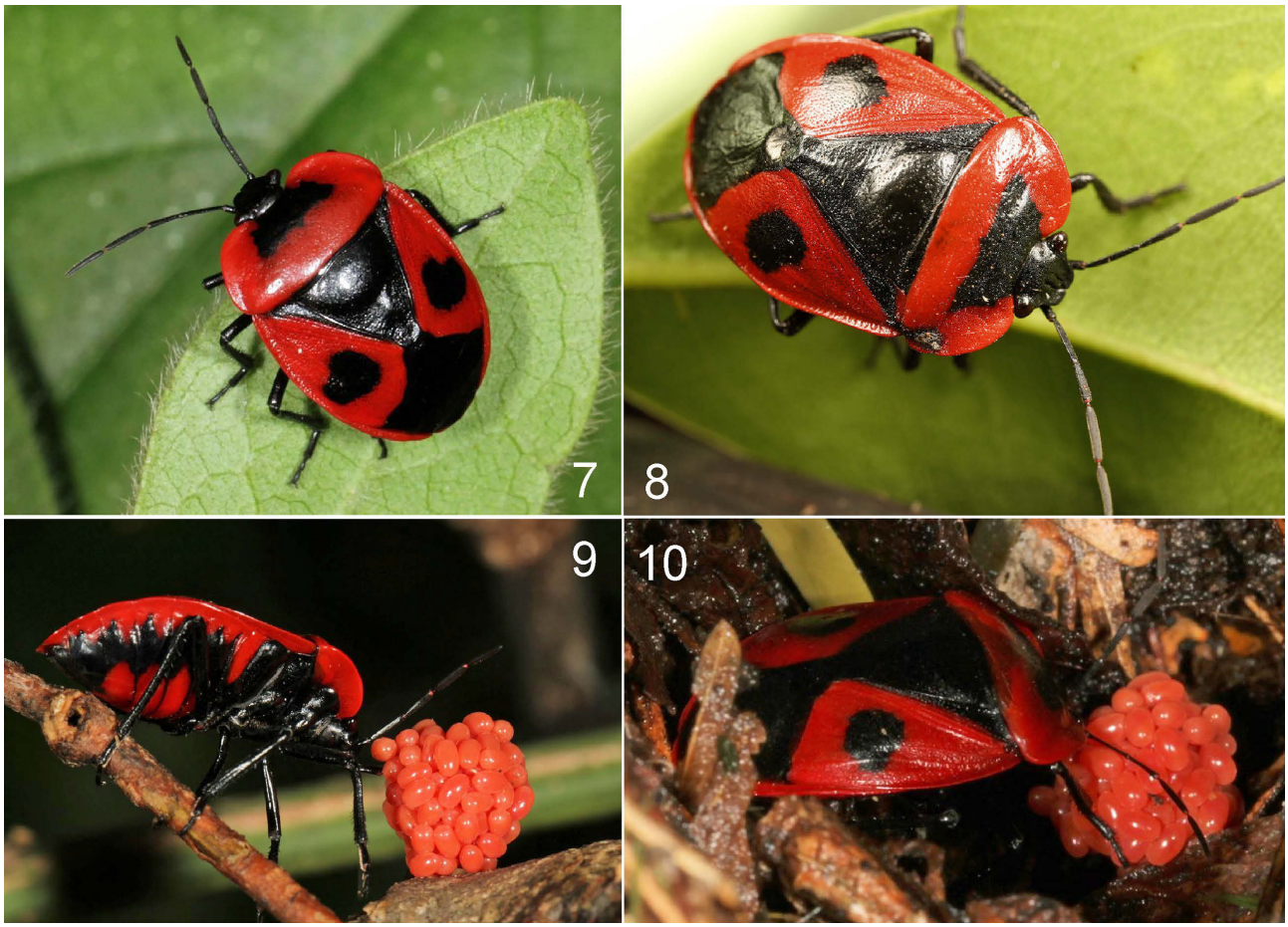
SOUTH AFRICA: Otters Den, an island in the Blyde River near Hoedspruit, Blyde riverine forest, Latitude/Longitude: –24.405, 30.814, 2013_12_29, coll. W. Uys, det. D.H. Jacobs (Figs 9–10).

There is also one additional record in iNaturalist: https://www.inaturalist.org/observations/36374711.

RESULTS AND DISCUSSION

Currently, six species endemic to the Afrotropical region are included in the genus *Dismegistus* (Robertson, 2009). Since this genus has never been taxonomically revised, identification for the present study should be considered tentative.

The specific behaviour of caring for eggs by *D.* cf. *fimbriatus* and *D.* cf. *binotatus* is depicted in photographs of live specimens (Figs 1–6, 9–10). As suggested by Jacobs (2013), in his comments uploaded to the online platform iNaturalist in 2013, these photographs illustrate an important behavioural difference from the maternal care reported in other pentatomoids, since females of *Dismegistus* species carry the eggs glued together in a ball on their labium and guard them in this way. However, this behav-



Figs 7–10. *Dismegistus* cf. *binotatus*. 7–8 – adults (South Africa, Otters Den, photographer W. Uys). 9–10 – adult female carrying a batch of eggs (South Africa, Otters Den, photographer W. Uys).

iour is also reported for females of species in the subfamily Sehirinae and family Parastrachiidae (Gyotoku & Tachikawa, 1980; Tachikawa & Schaefer, 1985; Tsukamoto & Tojo, 1992; Filippi-Tsukamoto et al., 1995; Filippi et al., 2001). Other pentatomoids that guard their eggs glue them to a substrate (for a review, see Tallamy & Schaefer, 1997).

The similarity in maternal care may indicate a close evolutionary relationship between species of *Parastrachia* and *Dismegistus* and between *Dismegistus* and species of the subfamily Sehirinae (Southwood, 1956; Filippi-Tsukamoto et al., 1995; Kight, 1997; Filippi et al., 2001, 2009; Sweet & Schaefer, 2002; Agrawal et al., 2005; Hironaka et al., 2005; Mukai et al., 2010; Inadomi et al., 2014; Filippi & Nomakuchi, 2022). Nevertheless, since paternal care has evolved several times independently in Heteroptera, whether this is an example of an evolutionary relationship, a convergence phenomenon, or parallel evolution (Cerca, 2023) remains an open question and requires further research.

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CONFLICT OF INTEREST. The authors declare no conflict of interest.

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