New record of a pseudo-orb weaver, \textit{Fecenia ochracea} (Doleschall, 1859) in Singapore (Araneae: Psechridae)\\

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Abstract. This paper clears the confusion regarding the presence of a pseudo-orb weaver, \textit{Fecenia ochracea} (Doleschall, 1859) in Singapore. Diagnostic features of the species are provided to distinguish it from \textit{Fecenia protensa} (Thorell, 1891) which appears more common in Singapore. Photographs of its habitus, habitat, and web structure are shown for the first time.\\

Key words. spider, taxonomy, checklist, pseudo-orbwebs, distribution, Central Catchment Nature Reserve, Pulau Ubin, \textit{Psechrus}\\

INTRODUCTION\\

Four species of \textit{Fecenia} are currently recognised worldwide, viz., \textit{Fecenia cylindrata} (Thorell, 1895), \textit{Fecenia macilenta} (Simon, 1885), \textit{Fecenia ochracea} (Doleschall, 1859), and \textit{Fecenia protensa} (Thorell, 1891). They are confined to the tropical region ranging from southern India, Southeast Asia to north-eastern Australia and a few nearby Pacific Islands (World Spider Catalog, 2017).\\

The presence of \textit{Fecenia} in Singapore was first reported by Simon (1892: 225). He observed the web of an unnamed \textit{Fecenia} in Singapore and noted that the strong web was stretched between two trees, with its “central part occupied by a tightly woven mesh instead of being traversed by radial and circular lines”. Several species of \textit{Fecenia} have been recorded in Singapore since then, but there has been some confusion regarding their taxonomic placement. Levi (1982) reported the presence of a \textit{Fecenia macilenta} in Singapore (collected by H. N. Ridley, the former Director of the Singapore Botanic Gardens, in 1898). Based on Levi’s description and illustrations, Koh (1989) identified the common Singapore \textit{Fecenia} as \textit{Fecenia macilenta} and provided an illustration of the female. Murphy (1986) indicated that \textit{Fecenia macilenta} was present in peninsular Malaysia and may possibly occur in Singapore. The possibility of \textit{Fecenia macilenta} occurring in Singapore was suggested again in a checklist of Southeast Asian spiders (Murphy & Murphy, 2000). They also reported the presence of another \textit{Fecenia} species, viz., \textit{Fecenia ochracea}, in Singapore and the Philippines. Based on Murphy & Murphy’s (2000) record of \textit{Fecenia ochracea}’s presence in Singapore, Song et al. (2002) counted \textit{Fecenia ochracea} as part of Singapore’s spider inventory. However, in his monograph of the genus \textit{Fecenia}, Bayer (2011) disputed the inclusion of \textit{Fecenia ochracea} in Singapore’s checklist by Song et al. (2002), on the grounds that the entry was not supported by any published record of authoritatively identified specimens. In the same monograph, Bayer pointed out that specimens of Levi’s and Koh’s purported \textit{Fecenia macilenta} from Singapore were misidentified, and were in fact \textit{Fecenia protensa}.\\

The foregoing review suggests that until now, only the presence of \textit{Fecenia protensa} in Singapore has been beyond dispute. There is still some uncertainty about the inclusion of \textit{Fecenia ochracea} in the Singapore inventory. This paper confirms its presence in Singapore, and reports some field observations about its habits and habitat. It also features, for the first time, images of its web and male habitus. It also provides illustrations to help readers to distinguish between \textit{Fecenia ochracea} and \textit{Fecenia protensa}.\\

TAXONOMY\\

The genus \textit{Fecenia} is one of the two genera in the family Psechridae, the other being \textit{Psechrus}, represented in Singapore by \textit{Psechrus singaporensis} (Thorell, 1894) (Simon, 1892; Levi, 1982; Bayer, 2011) Both \textit{Fecenia} and \textit{Psechrus} are long-legged, medium-sized spiders possessing a cribellum (cigar-shaped plate on the ventral side of the abdomen close to the spinnerets). However, \textit{Fecenia} spiders have anterior median eyes that are larger than all other eyes (Fig. 1a). In the case of \textit{Psechrus}, the anterior median eyes are equal or smaller than other eyes (Fig 1b). A pair of white or beige patches can often be found on the ventral side of the abdomen in \textit{Fecenia} (Fig 2a), occasionally the patches merge into a transverse band (Fig. 2b). Such ventral patches or bands are absent in \textit{Psechrus}; instead a light-coloured median line runs
longitudinally on their venter (Fig. 2c). Adult *Fecenia* build pseudo-orb webs (Fig. 3a), unlike *Psechrus*, which build dome-shaped sheet webs (Fig. 3b).

**RECORDS & OBSERVATIONS**

All specimens examined in this paper will be deposited at the Lee Kong Chian Natural History Museum at the National University of Singapore. Identification was based on the descriptions provided by Levi (1982) and Bayer (2011).

*Fecenia ochracea* (Doleschall, 1859)


Morphological observations. The general habitus of male and female *Fecenia ochracea* are shown in Figs. 4–7. The most obvious somatic difference between *Fecenia ochracea* and the more common *Fecenia protensa* is the larger size of the females of the former species. Of the specimens examined, male *Fecenia ochracea* ranged from 7.9–8.2 mm in length.

Fig. 2. Ventral view of a) female *Fecenia protensa*; b) female *Fecenia ochracea* and c) sub-male *Psechrus singaporensis*. (Photographs by: Joseph K.H. Koh).
Fig. 3. Web Structure of a) *Fecenia protensa* (pseudo orbweb); b) *Psechrus singaporensis* (dome). (Photographs by: Joseph K.H. Koh).
Fig. 4. Male *Fecenia ochracea* a) dorsal view, b) lateral view. (Photographs by: Joseph K.H. Koh)
and female from 12.9–15.5 mm. In the case of *Fecenia protensa*, the lengths were 6.5–8.2 mm (males) and 8.4–12.1 mm (females). There are also clear differences between the two species in their abdominal patterns although such distinctiveness may be blurred among the specimens found elsewhere (see paragraph on intra-specific variations later). Dorsally, the paired dark patches of *Fecenia ochracea* are more conspicuous than those in *Fecenia protensa* (Figs. 4a, 6a). While such patches in *Fecenia protensa* remain largely disparate (Figs. 4a, 5), those in *Fecenia ochracea* tend to merge and become a chevron-shaped band, often defined anteriorly with a whitish line (Figs. 4a, 5). Ventrally, the dark-coloured venter of *Fecenia ochracea* is traversed by a pale irregular band (Fig. 2b); in contrast, the venter of *Fecenia protensa* shows a pair of pale patches framing a dark hour-glass pattern (Fig. 2a).

The two species can more easily be separated by the structures of their genitalia. *Fecenia ochracea* males may be recognised by the characteristically large and massive median apophysis (MA) of their palps (Figs. 8a, 8b). The retrolateral tibial apophysis (RTA) is longer than the width of its palpal tibia (Figs. 8b). In male *Fecenia protensa*, the RTA is knobbed and short (at most half the width of palpal tibia and as broad as it is long); the slender MA is also semicircular and shorter than the width of tegulum (Figs. 8c, 8d).

The epigyne of *Fecenia ochracea* can be recognised from its nose-like median septum and a pair of well-developed lateral lobes (LL) with widely divergent arms anteriorly (Figs. 9a). The strongly sclerotised section of the internal duct system (SSI) is wide (Fig. 9b). These characters distinguish the female from that of *Fecenia protensa*, whose epigyne shows the unmistakable W shape on the anterior part of median septum (AS), together with the darkened transversal ridge (TR) (Fig. 9c). The SSI is also more slender (Fig. 9d).

**Web architecture.** Like other *Fecenia* spiders, *Fecenia ochracea* builds a vertical pseudo-orb web with irregularly spaced mesh, in contrast with the regular orbwebs built by most araneids characterised by radial lines radiating from a hub and whorls of sticky spirals surrounding it. The spider hides in a retreat made of a large, dried, crumpled leaf suspended at the centre (Fig. 10). The leaves used by *Fecenia ochracea* are usually larger and broader than the smaller leaves with narrower blade preferred by *Fecenia protensa* (Fig. 6).
Fig. 6. Male *Fecenia protensa* a) dorsal view, b) lateral view. (Photographs by: Joseph K.H. Koh)
**Habitat.** *Fecenia ochracea* in Singapore appears to prefer degraded habitat. Specimens from Pulau Ubin were found next to forest trails on sites that have regenerated back into secondary forest, after occupants ceased their operation of old farms back in the 1980s (Fig. 11). Other specimens were photographed or collected in exposed fringes or shady trails in secondary forest in mainland Singapore.

**Intra-specific variations.** While all the specimens of *Fecenia ochracea*, both males and females, from Singapore show large dark patches and chevrons as depicted in the illustrations, they differ from those in Papua New Guinea, which do not have such patterns. Conspecific specimens from Papua New Guinea do not have a contiguous light and irregular band across the venter, but a distinct pair of pale patches, as illustrated by Levi (1982). Levi (1982) and Bayer (2011) also noted that the genitalia of this species may vary in dimension and minor details.

**DISCUSSION**

With the detailed descriptions given in the monograph by Bayer (2011), we have been able to confirm that *Fecenia ochracea* occurs in Singapore, clearing the doubt cast by Bayer himself about the presence of the species in this country. This new record adds a new point to the range of *Fecenia ochracea*, which has hitherto been documented in Malaysia (Johor, Sabah), Indonesia (Nanggroe Aceh Darussalam in Sumatra, West Java, Maluku, North Maluku, West Papua, Papua), the Philippines (Luzon), Australia (Northern Queensland), Papua New Guinea, and the Solomon Islands. (Bayer, 2011; Murphy & Murphy, 2000).
Fig. 8. Male palps of a) *Fecenia ochracea* (ventral); b) *Fecenia ochracea* (retrolateral); c) *Fecenia protensa* (ventral); d) *Fecenia protensa* (retrolateral). MA = median apophysis, RTA = retrolateral tibial apophysis, T = Tegulum. Scale Bar = 1mm. (Photographs by: Justin C.H. Tan).
Although many specimens of *Fecenia protensa* have been collected in Singapore, there are only five specimens of *Fecenia ochracea* in our collection. Despite intensive efforts to look for them, no specimens have been collected outside Pulau Ubin since 1986. While it is too early to say that the species is threatened and that Pulau Ubin is its last bastion, it is evident that *Fecenia ochracea* is a much rarer species, compared with *Fecenia protensa* in Singapore. It should however be noted that the species may not necessarily be endangered as it can still be found in relatively degraded forest fringes and does not seem associated with any ecologically vulnerable habitat.

In conclusion, there are two species of *Fecenia* in Singapore, viz., *Fecenia ochracea* and *Fecenia protensa*, corresponding to the two clusters of specimens with matched males and females in the entire Singapore collection examined by us. Earlier records of *Fecenia macilenta* in Singapore (Levi, 1982; Koh, 1989; Murphy & Murphy, 2000) should be amended as they were based on a specimen of *Fecenia protensa* initially misidentified by Levi as *Fecenia macilenta* (Bayer, 2011).
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LITERATURE CITED


