First record of the Grass Cross Spider (*Argiope catenulata*) of the family Araneidae in Australia

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Abstract

The Grass Cross Spider, *Argiope catenulata* (Doleschall 1859), is newly recorded from Australia based on collections made in early 2019 from three dams in the vicinity of Darwin, Northern Territory. Both sexes are illustrated, as is the egg sac and habitat. Preliminary discussion is given about its introduction and dispersal.

Introduction

Orb-weavers of the genus *Argiope* (family Araneidae), known in Australia as St. Andrew's Cross Spiders, are diurnal spiders known for the bold pattern of the females. Except for adult males, members of this genus construct circular webs distinctive because of the presence of a white silk stabilimentum which generally takes on a cross shape in most species. The legs are held in pairs in line with the stabilimentum, and the females have distinctive white or silver setae on the carapace. In the subfamily Argiopinae, the posterior eye row is procurved (i.e. the lateral eyes in one of the two transverse rows of eyes are more anterior than the median eyes), resulting in the lateral eyes being closely paired and the median eyes in a loose central square. The genus *Argiope* is further distinguished by the placement of the posterior median eyes closer to each other than to the lateral eyes. Males are significantly smaller and duller than females (Levi 1983).

Members of the genus occur throughout the world, especially in tropical and subtropical regions (World Spider Catalog 2019). The most recent review by Levi (1983) of the Western Pacific region listed 16 *Argiope* species for Australia, eight of which are present in the Northern Territory (i.e. *A. aetherea*, *A. dietrichae*, *A. katherina*, *A. ocyaloides*, *A. picta*, *A. protensa*, *A. radon* and *A. trifasciata*). Herein, we add an additional species, *A. catenulata*, thus bringing the total number of species recorded from Australia to 17.

Records and identification

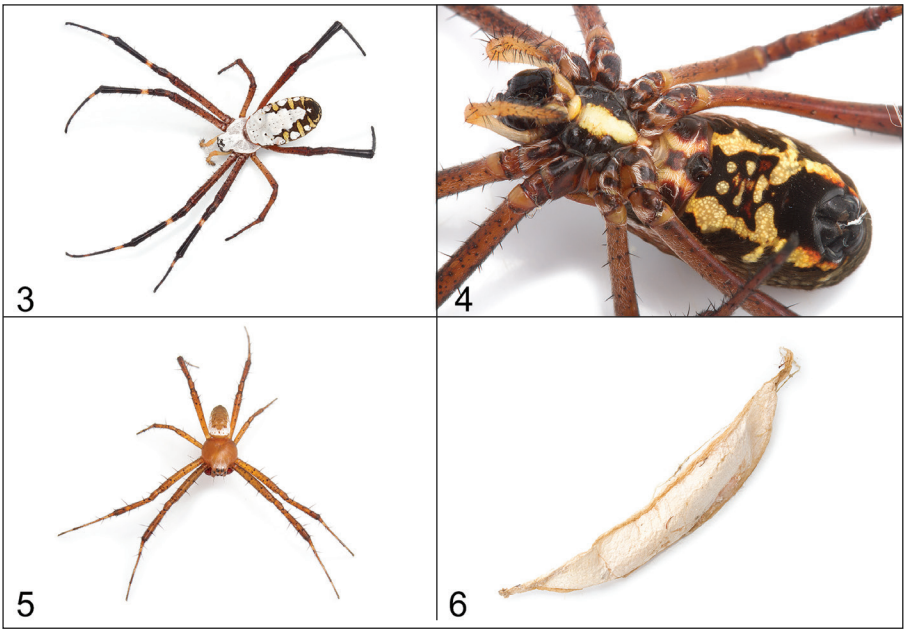
On 12 February 2019, the authors were taken by airboat onto Fogg Dam by Parks and Wildlife Ranger Dave McLachlan. Once out on the water, we spotted several individuals

Figure 1. Sedges at the water's edge, Fogg Dam. (Caitlin Henderson)

of an unidentified species of *Argiope* in orb webs stretching between the stems of the grass-like sedge *Eleocharis dulcis* (known as Chinese Water Chestnut) (Figure 1). Two specimens of these spiders were collected, which we subsequently identified using keys, descriptions and illustrations (including that of the epigynum) from Levi (1983), as *Argiope catenulata*, known commonly as the Grass Cross Spider.

Argiope catenulata (Figures 2–5) has distinct identifying markings on both the dorsal and ventral sides of the opisthosoma (i.e. the posterior part of the body, which includes the respiratory organs and the heart, behind the prosoma) in the female. The dorsal pattern could be interpreted as a silver trident, with the outer tines broken by four pairs of orange/yellow spots or transverse lines. The cephalothorax is silver (Figure 3). The male is also more readily identifiable than some other species by the margin of bright silver/white hairs on the dorsal opisthosoma

Figure 2. Adult female Grass Cross Spider (*Argiope catenulata*) feeding in her web. (Caitlin Henderson)



Figures 3–6. Adults and egg sac of *Argiope catenulata*: **3.** Adult female, dorsal view. **4.** Adult female, ventral view. **5.** Adult male, dorsal view. **6.** Egg sac detached from silk line. Lengths: female = 18 mm; male = 5 mm; egg sac = 45 mm.

(Figure 5). Most distinctive is the female venter where two yellow/white transverse bands meet, or almost meet, in the centre (Figure 4). Particularly, these features distinguish it from the Painted St. Andrew's Cross Spider (*Argiope picta*). The egg sacs are elongated and pale yellow-brown, hanging from the centre of a strong silk line in vegetation near the web (Figure 6).

Further investigation revealed that *A. catenulata* was first photographed at Fogg Dam in 2014 by Kim McLachlan. These observations were also made during an airboat trip. However, the photographs were not forwarded to specialists for identification.

A subsequent trip on 19 February 2019 to Harrison Dam (Figure 7) (a little over 3 km from Fogg Dam) turned up only a single specimen of *A. catenulata* despite us searching a large portion of the near-identical habitat. Notably, this specimen was found at a site that is frequently used for launching boats. Incidentally, we noted that *A. picta* was also present around the edges of Harrison and Fogg Dams.

On 28 February 2019, a small population of *A. catenulata* was also found by us at Manton Dam (Figure 7), and a single female was also spotted along the drainage lines between ponds at Durack, Palmerston (Figure 7). Similar habitat was searched in Berry Springs, but the species was not found to be present.

Specimens of *Argiope catenulata* from these collections are deposited in the Natural Science collection at the Museum and Art Gallery of the Northern Territory under the following registration numbers: A.5220–A.5224, A.5228 (= 6 lots containing 7 specimens in total from Fogg Dam); A.5227 (= 1 lot containing 1 specimen from Harrison Dam); A.5226, A.5227 (= 2 lots containing 2 specimens in total from Manton Dam).

Figure 7. Map of Darwin and rural area pinpointing localities at which *Argiope catenulata* was found in February 2019.

Discussion

While the same Parks and Wildlife airboat is in use across all three dams where the spiders were found, it is not in use at the ponds at Palmerston. However, reed-cutting equipment from Palmerston has been in use at Fogg Dam, so this is one possible explanation for this distribution pattern. Ballooning is the natural dispersal method of *Argiope* species, but patchy access to permanent water bodies in this region may have limited the success of hatchlings making it to further suitable habitat. Adult females taken from the sites at which the specimens were observed did not thrive in captive conditions suitable for other local *Argiope*, suggesting that these spiders are unable to survive away from water.

Argiope catenulata is a distinctive spider common to rice paddies (Poolprasert & Jongjitvimol 2014) from India to the Philippines, down to the southern coast of New Guinea (Levi 1983), and including the Malaysian Peninsula (Tan 2018) and Indonesia (Cheng & Kuntner 2014). It has not been previously recorded from Australia. On Fogg Dam, it is now a common species most frequently occurring in stands of *Eleocharis dulcis,* but also in limited numbers on other tall sedges (Figure 1). It appears largely restricted to the water, not being found on land or with land-adjacent webs.

The present abundance of *A. catenulata* at Fogg Dam raises questions about its relationship with this particular site. While it is not impossible that *A. catenulata* is native to northern Australia, given the proximity to New Guinea, the history of the dam itself is of note. In the 1950s, Fogg Dam was constructed to irrigate the nearby Humpty Doo Rice Project (Parks and Wildlife Commission of the Northern Territory 2017). Though the project ultimately failed, the introduction of rice and farming equipment to this area does point to other possible origins of this rice paddy-loving species. However, the species does not appear to be as widespread or as abundant at present for it to have been present for more than 60 years in the Top End of Australia where suitable habitats are so prevalent.

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