

**The slit spider (Araneae: Clubionoidea) that constructs fissures in the sand dunes of the Simpson Desert, Central Australia**

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The slit spider, *Fissarena ethabuka* gen. et sp. nov. is described in the superfamily Clubionoidea. It builds an unusual retreat in the sand dunes of the Simpson Desert, Central Australia. The spider constructs a horizontal slit into consolidated sand. Behind the wide entrance is a gradually-narrowing, flat burrow. The steep top edge of the crack hangs over a slipface of loose sand at the mouth of the burrow, which serves as a trap for crawling prey, especially ants. Slit spiders were common, particularly on the dune crest, where 44% of the population occurred at a density of  $0.2 \text{ m}^{-2}$ . We suggest that the ubiquitous filamentous biogenic dune surface crust is crucial for the ability of this spider to construct such stable crevices in dune sand.

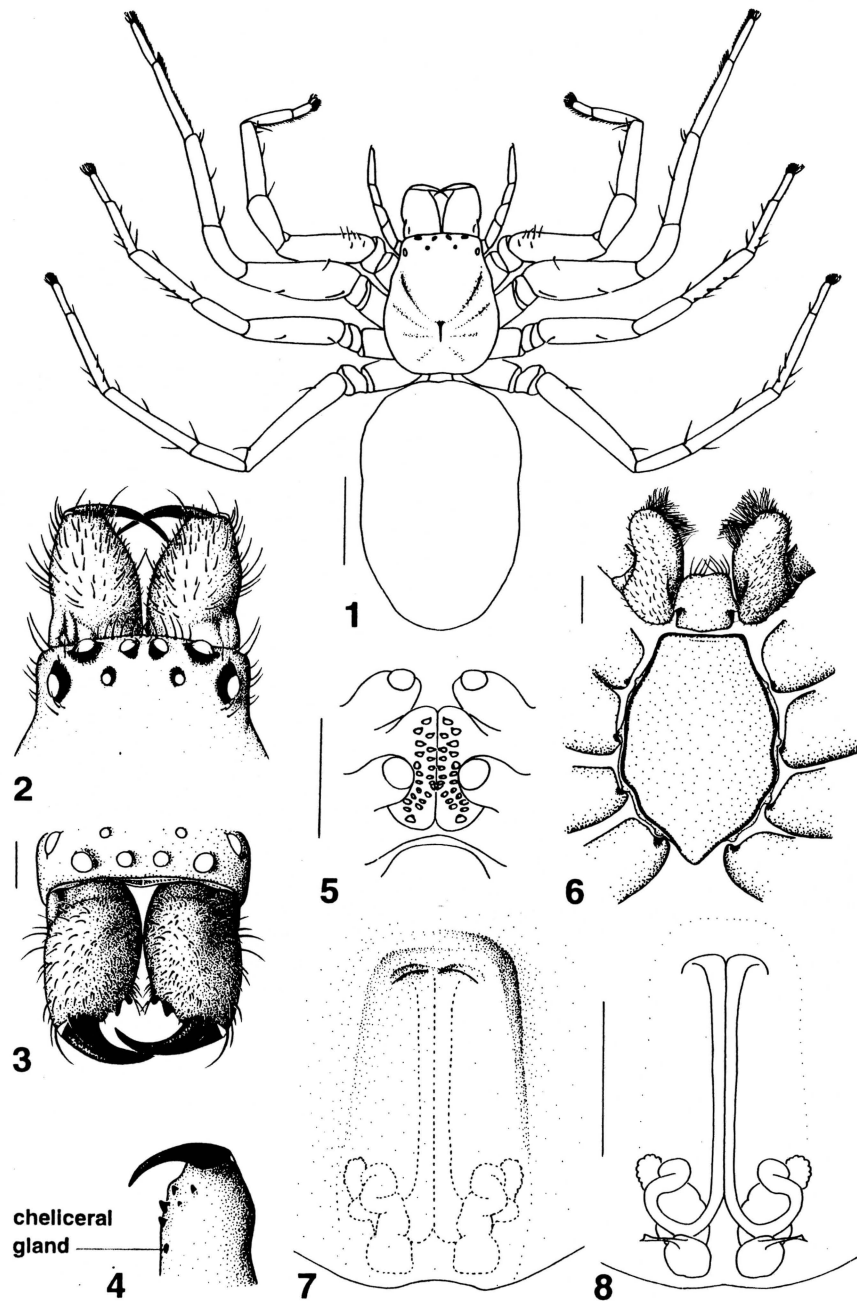
KEYWORDS: Araneae, Clubionoidea, new taxon, desert, slit burrow, sand trap, sand dunes, Australia.

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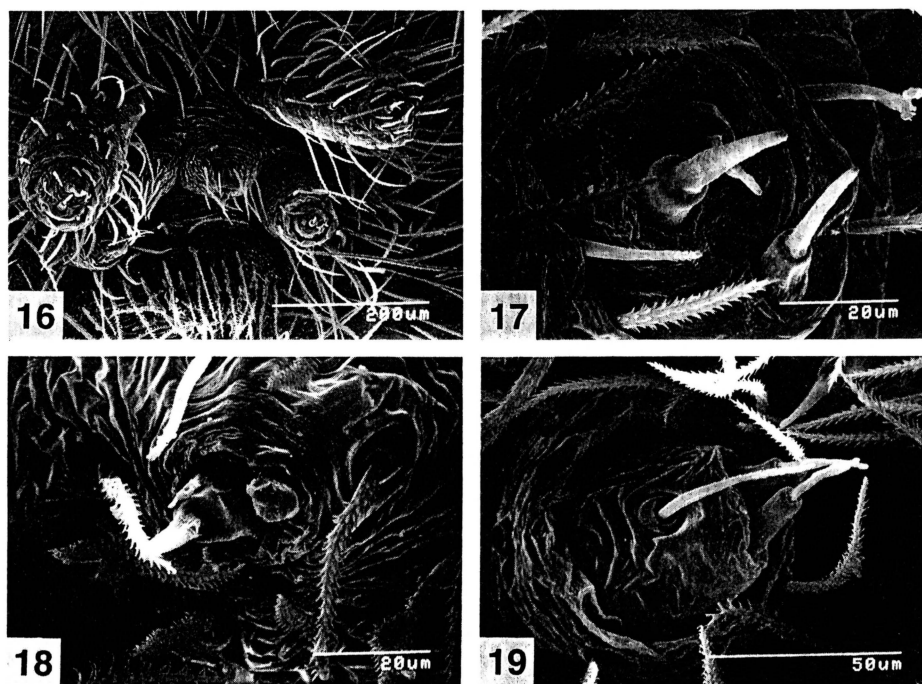
**Introduction**

Many desert spiders live in burrows to escape adverse climatic conditions or to conceal themselves from predators or prey (Main, 1982; Cloudsley-Thompson, 1983; Henschel and Lubin, 1992). In dunes, burrows are constructed either vertically or at an angle that is shallow enough to prevent sand cascading down. While vertical burrows require methods for lifting loose sand up and out of the burrows, shallow angular burrows can be cleared by sweeping or flicking the sand upwards (Henschel, 1990a). In both cases, silk is usually used to stabilize the burrow walls (JRH personal observations).

The slit spider described here is an exception, as it burrows into sand at an angle without the use of silk. This spider occurs in the Australian Simpson Desert, an area where little is known of spiders besides Hickman's study (1944). The dunes where slit spiders occur are covered by a 2-5 mm thick crust of unknown composition (perhaps Cyanobacteria, algae, mosses and/or lichens as found in dunes of the Middle East; Lange *et al.*, 1992). This crust covered the entire study area save for small, exposed patches of unconsolidated sand on dune crests away from vegetation. It often covers many older crusts that stabilize the sand up to a depth of 15-20 cm. The slit spider appears to use the properties of this crust to good effect in a way not reported before.



FIGS 1-8. Female *Fissarena ethabuka* gen. et sp. nov.: (1) dorsal view; (2) eyes and chelicerae, dorsal view; (3) ditto, frontal view; (4) left chelicera; (5) spinnerets; (6) endites, labium and sternum; (7) epigynum, ventral view; (8) ditto, dorsal view. Scale lines = 0.5 mm except Fig. 1 = 2.5 mm.



FIGS 16–19. Spinnerets of juvenile *F. ethabuka*: (16) spinneret field; (17) ALS, left; (18) PMS, left; (19) PLS, right.

Table 1. Leg measurements (mm) holotype female *F. ethabuka* gen. nov.

	coxa	troch.	femur	pat.	tibia	mt.	t.	Total
I	1.4	0.3	3.4	1.7	2.6	2.4	1.2	13.0
II	1.3	0.3	3.7	1.8	2.8	2.5	1.3	13.7
III	1.3	0.4	3.2	1.6	2.5	2.5	(1.2)	12.7
IV	1.8	0.5	3.8	1.6	3.1	3.0	1.3	15.1

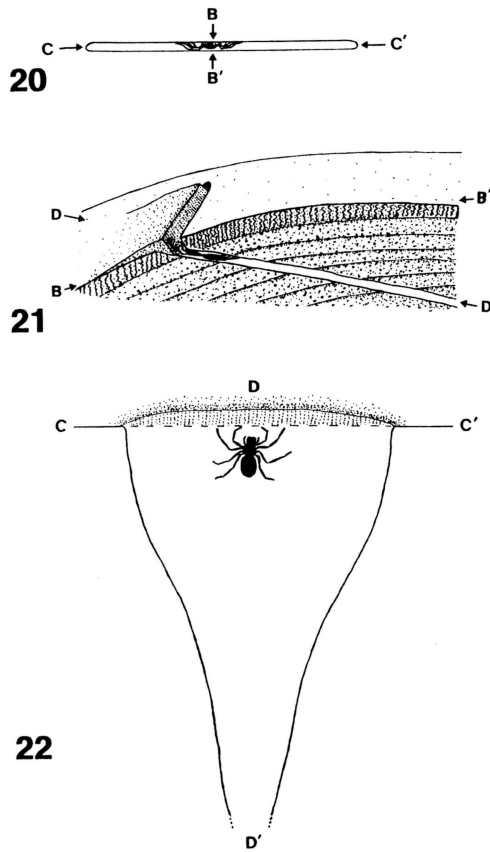
*Spinnerets of juvenile spider* (Fig. 16). Anterior spinnerets moderately separated with 3 spigots (Fig. 17); median spinnerets with 1 large spigot and a nubbin (Fig. 18); posterior spinnerets with 2 spigots (Fig. 19).

An examination of the female holotype under the light microscope showed that the tip of the anterior spinnerets has a sclerotised sub-distal ring, 2 major ampullate gland spigots and that it is without enlarged piriform spigots. There are numerous cylindrical gland spigots on the median spinnerets; these are arranged in 2 parallel rows of about 10 spigots each (Fig. 5).

The male is unknown.

#### Retreat and trap

*Fissarena ethabuka* excavates its burrow downwards into the sand at an angle of ca 20°. Burrow entrances ( $N = 64$ ) are  $3.0 \pm 0.8$  mm (SD, range 2–4 mm) high and



FIGS 20–22. Schematic representation of the burrow: (20) front view of the entrance; (21) vertical cross-section at B-B'; (22) horizontal cross-section at C-C' and D-D'. The method of prey capture is illustrated in (21): an approaching ant slips down the slipface of loose sand (fine stippling) to be captured by the spider positioned upside-down in the crevice.

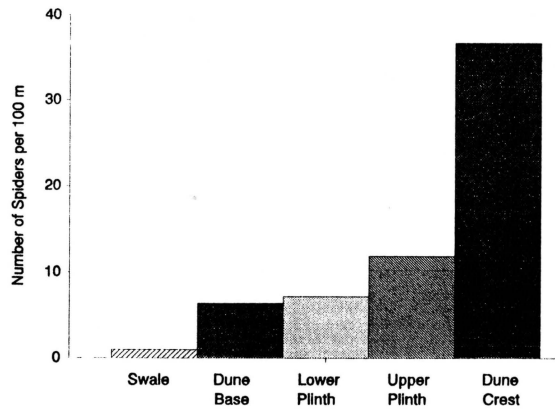


FIG. 23. Distribution of 41 slit spiders counted along three linear transects totalling 448 m across different dune habitats.

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