

A new species of *Hasarius* Simon, 1871 (Araneae: Salticidae) from Mumbai, India

Новый вид *Hasarius* Simon, 1871 (Araneae: Salticidae) из Мумбая, Индия

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КЛЮЧЕВЫЕ СЛОВА: Aranei, Hasariini, паук-скакунчик, Махараштра, таксономия.

ABSTRACT. A new species of the jumping spider genus *Hasarius* Simon, 1871 — *H. mumbai* Joshi et Tripathi, 2023 sp.n. (♂♀) — is described from few remaining green plots in Mumbai, India. A detailed morphological description, diagnosis and illustrations of the copulatory organs of both sexes are provided.

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РЕЗЮМЕ. Новый вид пауков-скакунчиков из рода *Hasarius* Simon, 1871 — *H. mumbai* Joshi et Tripathi, 2023 sp.n. (♂♀) — описан из немногих оставшихся зеленых мест Мумбая, Индия. Даны детальное описание, диагноз и иллюстрации копулятивных органов обоих полов.

Introduction

Simon [1871] erected the jumping spider genus *Hasarius* Simon, 1871, with the type species: *Attus adansoni* Audouin, 1826. The genus currently consists of 30 valid species [WSC, 2023], of which *Hasarius adansoni* and *H. kjellerupi* Thorell, 1891 are known from India [Caleb, Sankaran, 2023; WSC, 2023]. The former species was originally distributed in Africa and the Middle East but has been introduced to all continents; the latter species is restricted to the Nicobar Islands [Thorell, 1891; Prószyński, 2018; WSC, 2023]. Due to incomplete description and the lack of illustrations of the copulatory organs, Roewer [1955] doubted

the identity of *H. kjellerupi* and considered it *nomen dubium*; later as *species inquirenda* [Roewer, 1955; Prószyński, 2018; WSC, 2023].

In the present paper, a new *Hasarius* species is diagnosed and described based on the specimens collected along seasonal streams of the Conservation Education Centre (CEC), also known as the Nature Reserve of the Bombay Natural History Society (hereinafter BNHS), Mumbai, India.

Material and methods

Specimens were collected from the rocks situated along seasonal streams, preserved in 70% ethanol and studied under a Leica EZ4 stereo microscope. All measurements are in millimeters (mm) and were made with LAS software. Length of palp and leg segments are given as follows: total [femur, patella, tibia, metatarsus (except palp), tarsus]. The taxonomic terminology follows Kadam *et al.* [2021]. Live photos were taken with a Nikon D3400 camera and a Tamron 90mm f/2.8 Macro prime lens. The microphotographs were made with a Leica DMC4500 digital camera attached to a Leica M205A stereomicroscope with the software package Leica Application Suite (LAS, version 3.8) for stacking images taken at different focal planes. All the specimens are deposited in the NCBS, Bangalore, India.

Abbreviations used in the text: ALE — anterior lateral eye; AME — anterior median eye; do — dorsal; NCBS — National Centre for Biological Sciences Research Collections; pl — prolateral; pld — prolateral dorsal; PLE — posterior lateral eye; plv — prolateral ventral; PME — posterior median eye; rl — retrolateral; rld — retrolateral dorsal; rlv — retrolateral ventral; RTA — retrotibial apophysis; I–IV — 1st to 4th leg.



Figs 1–4. Live photographs (1–2) and collection site views (3–4) of *Hasarius mumbai* Joshi et Tripathi, sp.n.: 1 — holotype male, frontal view; 2 — same, dorsal view. Credits: Jatin Joshi (1–2), Pranav Joshi (3–4).

Рис. 1–4. Фотографии живых особей (1–2) и виды места сбора (3–4) *Hasarius mumbai* Joshi et Tripathi, sp.n.: 1 — голотип самец, спереди; 2 — то же, сверху. Благодарности: Jatin Joshi (1–2), Pranav Joshi (3–4).

Taxonomy

Salticidae Blackwall, 1841
Hasariini Simon, 1903

Hasarius Simon, 1871

TYPE SPECIES: *Attus adansoni* Audouin, 1826, by subsequent designation.

DIAGNOSIS. For a description and diagnosis of the genus see Prószyński [2018].

DISTRIBUTION. Cosmopolitan [WSC, 2023]

Hasarius mumbai Joshi et Tripathi, **sp.n.**
Figs 1–25

TYPES. HOLOTYPE ♂ (NCBS-AA-4156), India, Maharashtra, Mumbai, nr the BNHS Nature Reserve (19°09'45.8"N, 72°53'

30.8"E), 84 m a.s.l., hand-collected from rock, 4.10.2022, P. Joshi. PARATYPE ♀ (NCBS-AA-4157), same locality, 8.11.2022, P. Joshi.

ETYMOLOGY. The specific epithet is a noun in apposition referring to the type locality, the city of Mumbai, India.

DIAGNOSIS. In dorsum colour pattern (viz., a light wide stripe and a pair of tiny, prominent white spots posteriorly), the short embolus and the markedly sclerotized epigyne with the posterior M-shaped pocket, *H. mumbai* sp.n. is most similar to *H. adansoni*. It can be separated from *H. adansoni* by the following characters: the embolus thick, originating medially (thin, prolaterally in *H. adansoni*); the cymbium long, narrowing distally (relatively short and with the same width along its entire length in *H. adansoni*); the cymbium with a small baso-retrolateral extension (absent in *H. adansoni*); the short and curved copulatory ducts (comparatively long and twisted in *H. adansoni*) (cf. Figs 1–2, 5–24 with figs 125–131 in Žabka [1997]).



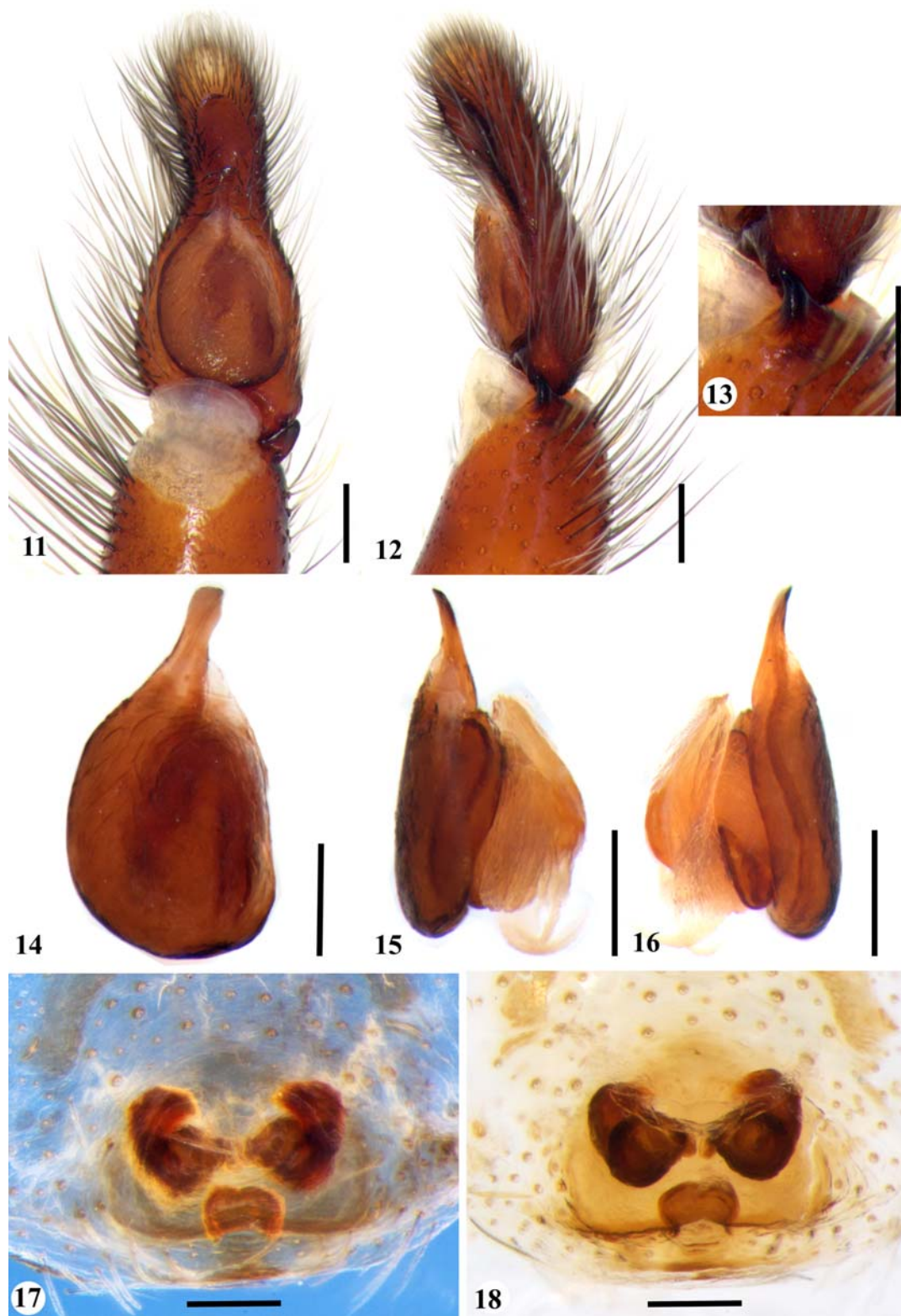
Figs 5–10. *Hasarius mumbai* Joshi et Tripathi, sp.n., holotype male and paratype female: 5 — male habitus, dorsal view; 6 — same, lateral view; 7 — same, frontal view; 8 — female habitus, dorsal view, 9 — same, lateral view; 10 — same, frontal view. Scale bars: 0.1 mm.

Рис. 5–10. *Hasarius mumbai* Joshi et Tripathi, sp.n., голотип самец и паратип самка: 5 — габитус самца, сверху; 6 — то же, сбоку; 7 — то же, спереди; 8 — габитус самки, сверху, 9 — то же, сбоку; 10 — то же, спереди. Масштаб: 0,1 мм.

DISTRIBUTION. Known only from the type locality (Fig. 25).

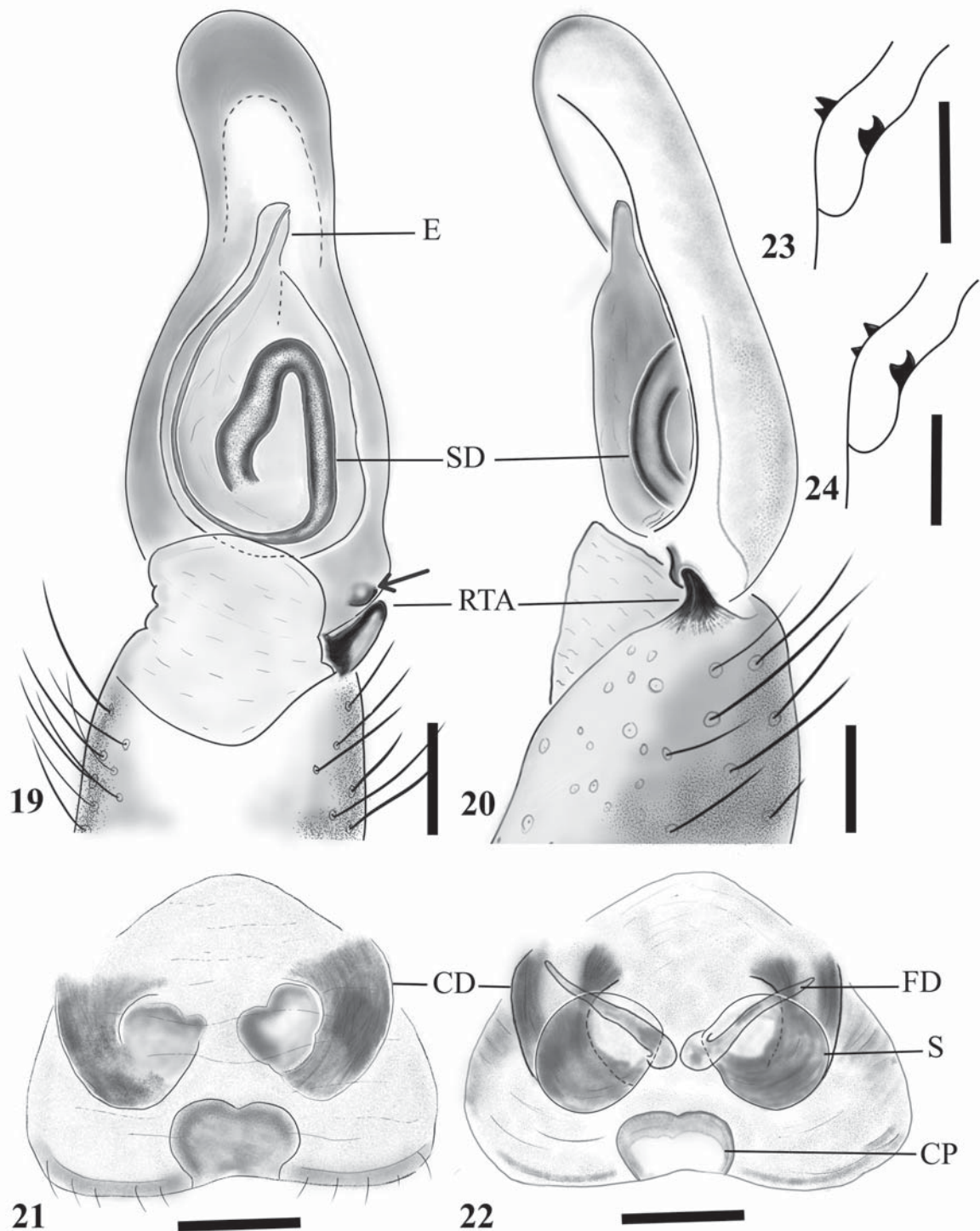
DESCRIPTION. HOLOTYPE MALE (Figs 1–2, 5–7, 23). COLOURATION (in alcohol). Carapace brown, with white lateral bands of nearly uniform thickness (Fig. 5). Eye field black, mid-anteriorly with a streak of white hairs (Fig. 5).

Clypeus densely covered with intermixed white and rusty coloured hairs (Fig. 7), forming a continuation with the lateral white stripes of carapace. Chelicerae long, rusty brown, with a thick mid-dorsal transverse layer of white hairs; promargin with two contiguous teeth, one large and one small, and retromargin with single fissidentate tooth (Figs 7, 23).



Figs 11–18. *Hasarius mumbai* Joshi et Tripathi, sp.n., holotype male and paratype female: 11 — left male palp, ventral view; 12 — same, retrolateral view; 13 — detail of retrolateral tibial apophysis; 14 — bulb, ventral view; 15 — same, retrolateral view; 16 — same, prolateral view; 17 — epigyne, ventral view; 18 — vulva, dorsal view. Scale bars: (11–16) 0.2 mm, (17–18) 0.1 mm.

Рис. 11–18. *Hasarius mumbai* Joshi et Tripathi, sp.n., голотип самец и паратип самка: 11 — левая пальпа самца, снизу; 12 — то же, сбоку-сзади; 13 — деталь ретролатерального отростка; 14 — бульбус, снизу; 15 — то же, сзади-сбоку; 16 — то же, спереди-сбоку; 17 — эпигина, снизу; 18 — вульва, сверху. Масштаб: (11–16) 0,2 мм, (17–18) 0,1 мм.



Figs 19–24. *Hasarius mumbai* Joshi et Tripathi, sp.n., holotype male and paratype female: 19 — left male palp, ventral view; 20 — same, retrolateral view; 21 — epigyne, ventral view; 22 — vulva, dorsal view; 23 — left male chelicera, retrolateral view; 24 — left female chelicera, retrolateral view. Arrow indicates a small baso-retrolateral extension of the cymbium. Abbreviations: CD — copulatory duct; CP — central pocket; E — embolus; FD — fertilization duct; RTA — retrolateral tibial apophysis; S — spermatheca; SD — sperm duct. Scale bars: (19–20) 0.2 mm, (21–24) 0.1 mm.

Рис. 19–24. *Hasarius mumbai* Joshi et Tripathi, sp.n., голотип самец и паратип самка: 19 — левая пальпа самца, снизу; 20 — то же, сбоку-сзади; 21 — эпигина, снизу; 22 — вульва, сверху; 23 — левая хелицера самца, сбоку-сзади; 24 — левая хелицера самки, сбоку-сзади. Стрелка указывает на небольшое базо-ретролатеральное вздутие на цимбиуме. Сокращения: CD — копулятивный проток; CP — центральный карман; E — эмболоус; FD — оплодотворительный канал; RTA — ретролатеральный отросток; S — сперматека; SD — семенной каналец. Масштаб: (19–20) 0,2 мм, (21–24) 0,1 мм.

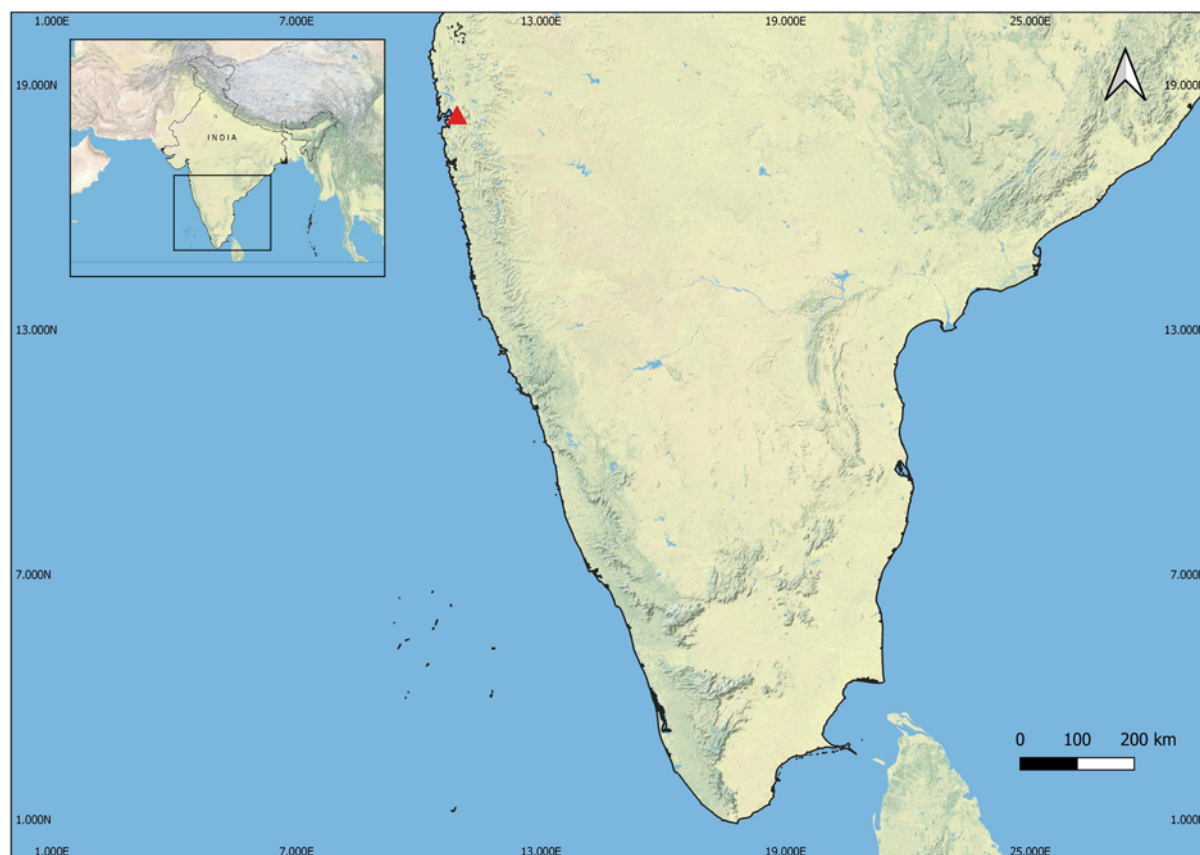


Fig. 25. Collecting locality of *Hasarius mumbai* Joshi et Tripathi, sp.n.

Рис. 25. Место находки *Hasarius mumbai* Joshi et Tripathi, sp.n.

Endites, labium and sternum orange-brown. Abdomen oval, dorsum with white stripe anteriorly and a pair of small but striking white spots posteriorly (Fig. 5). MEASUREMENTS. Body length 6.45. Carapace 3.81 long, 2.89 wide. Abdomen 2.64 long, 1.85 wide. Ocular area 1.46 long, 2.03 wide. Eye sizes and interdistances: AME 0.66, ALE 0.39, PME 0.11, PLE 0.37; AME–AME 0.05, AME–ALE 0.07, PME–PME 1.91, ALE–ALE 1.47, PME–PLE 0.29, PLE–PLE 1.65, ALE–PME 0.55, ALE–PLE 0.98. Chelicera length 1.47. Clypeus height at AMEs 0.23. Sternum 1.39 long, 0.88 wide. Length of palp and legs: palp 3.68 [1.25, 0.67, 0.72, 1.04], I 9.32 [2.82, 1.50, 2.40, 1.67, 0.93], II 6.82 [2.20, 1.06, 1.56, 1.28, 0.72], III 7.62 [2.44, 1.06, 1.48, 1.79, 0.85], IV 7.76 [2.50, 0.93, 1.62, 1.82, 0.89]. Leg formula: 1432. Spination of palp: femur pld 2 do 2, patella pl 2 do 1, tibia pld 1 do 2 rl 1, tarsus/cymbium pl 2 do 2 rl 1 rld 1. Legs: femur I pl 1 pld 1 do 3, II pl 1 pld 1 do 3 rld 2, III pld 1 do 3 rld 1, IV do 3 rld 2; patellae I–II pl 1, III–IV pl 2 rl 1; tibiae I–II pl 2 plv 3 rlv 3, III–IV pl 1 pld 2 plv 2 do 2 rl 2 rld 1 rlv 1, metatarsi I–II plv 2 rlv 2, III–IV pl 2 pld 1 plv 2 rl 1 rld 1 rlv 2; tarsi I–IV 0. PALP (Figs 1, 7, 11–16 & 19–20): segments brownish. Mane of white setae stretching dorsally over palps – from the distal end of the femur to mid-length of the tibia, ending distally by a characteristic oblique bunch of long white setae (Figs 1, 7, 11–12). Bulbus oval, and translucent leaving visible only part of the spermatophore (Figs 11, 14, 19). RTA is short, claw-like, with a slightly angular apex (Figs 12–13, 20). Cymbium gradually narrows anteriorly, with a long apical part, with a small baso-retrolat-

eral extension (Figs 11, 19). Embolus translucent, short, disto-medially originating, with a blunt tip, directed at 2-o'clock ventrally (Figs 11, 14, 19).

PARATYPE FEMALE (Figs 8–10, 24). COLOURATION (in alcohol). General aspects as in the male except as follows: carapace without lateral white margins (Fig. 8), cheliceral promargin with slightly separated teeth (Fig. 24), palpal mane with lesser white setae (Fig. 10), and abdomen with faint dorsum stripe and posterior spots (Fig. 8). MEASUREMENTS. Body length. 5.92. Carapace 3.24 long, 2.53 wide. Abdomen 2.68 long, 2.01 wide. Ocular area 1.39 long, 2.12 wide. Eye sizes and ocular distance: AME 0.60, ALE 0.34, PME 0.10, PLE 0.34; AME–AME 0.07, AME–ALE 0.13, PME–PME 1.77, ALE–ALE 1.41, PME–PLE 0.29, PLE–PLE 1.57, ALE–PME 0.53, ALE–PLE 0.89. Chelicera length 1.01. Clypeus height at AMEs 0.21. Sternum 1.19 long, 0.81 wide. Length of palp and legs: palp 2.75 [1.04, 0.54, 0.55, 0.62], I 6.91 [2.74, 0.93, 1.55, 0.93, 0.76], II 4.93 [1.66, 0.81, 1.09, 0.82, 0.55], III 6.46 [2.07, 0.71, 1.43, 1.49, 0.76], IV 6.65 [2.28, 1.01, 1.26, 1.27, 0.83]. Leg formula: 1432. Spination of palp: femur do 3, patella, tibia & tarsus/cymbium spineless; legs: femur I pl 1 pld 1 do 3, II pl 1 pld 1 do 3 rld 2, III pld 1 do 3 rld 1, IV do 3 rld 1; patellae I–II pl 1, III–IV pl 1 rl 1; tibiae I–II plv 3 rlv 3, III–IV pl 2 pld 1 plv 2 do 1 rl 2 rld 1 rlv 1, metatarsi I–II plv 2 rlv 2, III–IV pl 2 pld 2 plv 2 rl 1 rld 2 rlv 2; tarsi I–IV 0. COPULATORY ORGANS (Figs 17–18, 21–22): epigyne hirsute; copulatory openings indistinct; epigynal pocket M-shaped, situated baso-medially (Figs 17, 21); vulva with short, broad, slightly

curved copulatory ducts, arising laterally, converging (Figs 18 & 22); spermathecae small, oval, slightly separated from each other (Figs 18, 22); fertilization ducts narrow, diverging (Figs 18, 22).

Discussion

The BNHS Nature Reserve is a 33-acre land in Mumbai and is one of the few pristine mixed moist deciduous forest types in India. This reserve shares its boundary with the Sanjay Gandhi National Park and the Dadasaheb Phalke Chitra Nagri, popularly known as the Goregoan Film City. The rainfall in the monsoon gives rise to many seasonal streams in this region, and *H. mumbai* sp.n. was found on rocks along such seasonal streams.

The genus *Hasarius* is widespread in almost all the biogeographic zones except for Antarctica [WSC, 2023], but not much is known about the conservation status of its species. Yet, three *Hasarius* species from the Seychelles are currently included in the IUCN Red List: viz., *H. mahensis* Wanless, 1984 is listed as critically 'endangered' (CR); *H. rufociliatus* Simon, 1898 as 'vulnerable' (VU); and *H. adansoni* as 'least concerned' (LC) [Gerlach, 2014a–c].

Disclosure statement

No potential conflict of interest was reported by the authors.

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