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Cover: A Southern Rockhopper Penguin *Eudyptes chrysocome* stands on Tussock Grass on Westpoint Island. Painted in poster colors, this artwork is a reproduction of a photograph by Phillip Colla. Thanks to the photographer for the original image. © Pooja Patil.



First record of an Amber Snail *Succinea daucina* Pfeiffer, 1855 (Gastropoda: Succineidae) from Bihar, India

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Succineidae Beck, 1837 is an Amber Snail's family, mostly amphibious, pseudo-amphibious, (semi-aquatic behavior that can survive in moist environments but is not fully aquatic) or strictly terrestrial creatures widely distributed across the globe (Rao 1924; Pilsbry 1948; Barker 2001). The highest diversity has been recorded in India, the Pacific Islands, and the Americas (Pilsbry 1948; Patterson 1971; Barker 2001; Rundell et al. 2004). The succineids are currently placed in two families and 20 genera, of which three are fossils (MolluscaBase 2021). Indian succineids cover 27 species under five genera, of which 20 are endemic (Ramakrishna et al. 2010). The genus *Succinea* Draparnaud, 1801, is one of the most species-rich genera, with 225 species (19 species are fossils) and is widely distributed across the world (MolluscaBase 2021). In India, this genus represents 17 species, of which 15 are endemic (Ramakrishna et al. 2010). While working on the benthic diversity of urban ponds in Patna by the first author, 10 shells of *Succinea daucina* were collected from Sandalpur pond (25.606° N, 85.185° E) (Image 1), and Phulwari Sharif pond (25.581° N, 85.077° E) (Image 2) in Patna. Photographs of specimens were taken from apertural, lateral, dorsal, apical, and umbilical sides with a scale bar (Image 3). The specimens were identified based on

the published literature (Pfeiffer 1885; Mitra et al. 2004) and distinguished by their morphological characteristics. Additionally, collected specimens were compared with specimens housed in the National Zoological Collection of the Zoological Survey of India, Kolkata. The current taxonomic status of *Succinea daucina* is as follows:

Kingdom: Animalia

Phylum: Mollusca

Class: Gastropoda

Order: Stylommatophora

Superfamily: Succineoidea

Family: Succineidae

Genus: *Succinea*

Species: *Succinea daucina* L. Pfeiffer 1855

Succinea daucina, described by Pfeiffer from Calcutta [=Kolkata] in 1855 from Cuming's collection, is an air-breathing land snail, commonly called Amber Snails. The shell of *S. daucina* is characterized by a thin and medium sized shell, a fragile, ovately conical body, an inflated body whorl, and a short, twisted spire. The color of the shell is pale white to amber, rounded at the base, with three increasing whorls, with the last being the largest whorl. The species was previously distributed in Tripura and part of the West Bengal States of India (Pfeiffer

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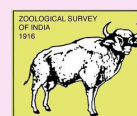
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1885; Raut et al. 1997; Mookherjee et al. 2000; Mitra et al. 2004; Ramakrishna et al. 2010; Tripathy & Sajan 2022). Limited literature is available on the dimensions. A size-dependent study on growth and reproduction was carried out by Nandy et al. (2023), where the authors showed the size class (2–12 mm) shell length, among which shell length, which achieved sexual maturity, was 6–7 mm. In the present study, different measurements, i.e. height (H), width (D), height of last whorl (LW), height of aperture (HA), and width of aperture (WA), were taken

Table 1. Minimal values (min), maximal values (max), mean (M) and standard deviation (SD).

	Min–max (mm)	M±SD (n=10)
Height (H)	5.5–8.8	6.91±0.97
Diameter (D)	3.9–5.9	4.34±0.60
Height of aperture (HA)	3.7–6.7	5.4±0.73
Height of last whorl (LW)	4.5–7.5	6.2±0.80
Width of aperture (WA)	3.2–5.5	3.71±0.67
Spire ratio (SR)	0.02–0.18	0.09±0.04

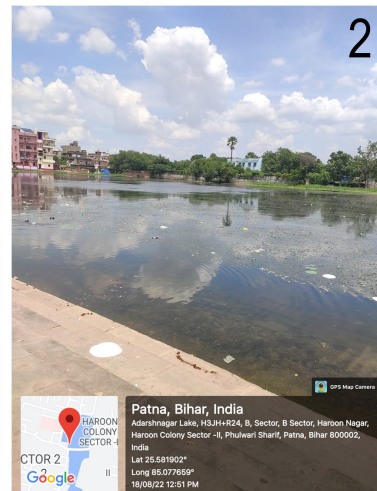
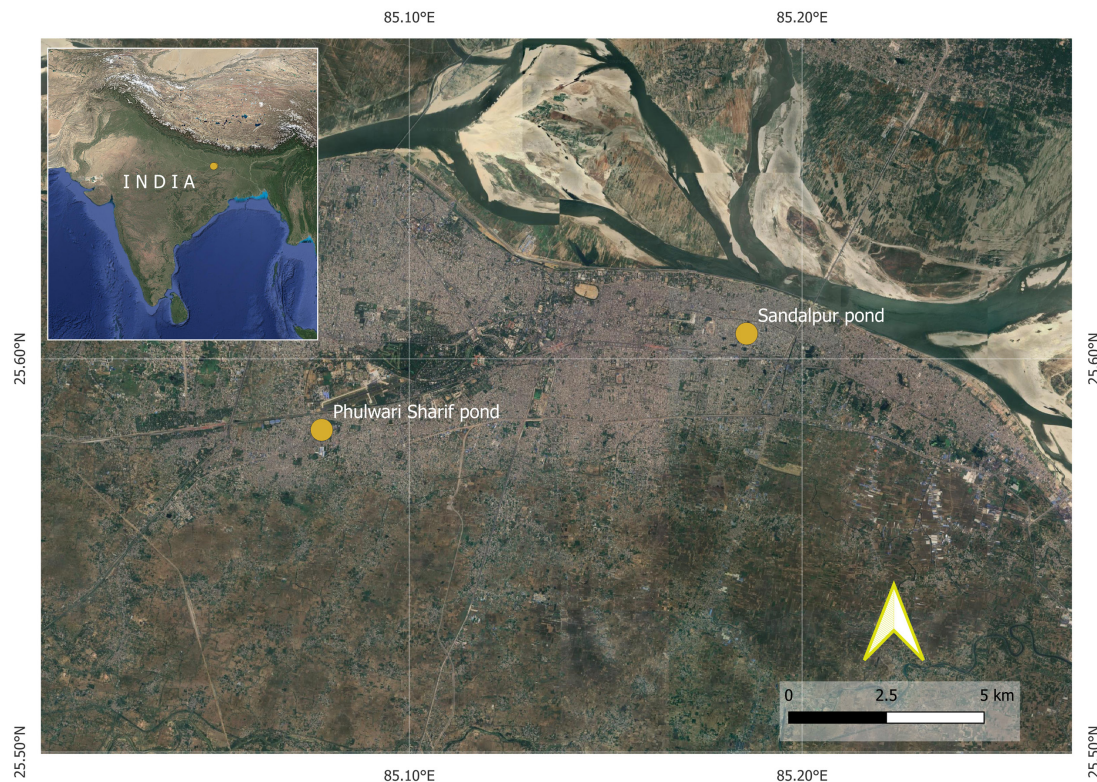


Image 1 & 2. Study area - satellite image of the ponds from where the specimens were collected (source: Google Earth). 1—Sandalpur pond | 2— Phulwari Sharif Pond.



Image 3. Shells of *Succinea daucina* Pfeiffer, 1855 from pond sediments, Patna, Bihar: upper row (left to right)—apertural, lateral, and dorsal views | lower row (left to right)—apical and umbilical views). © Dipty Kumari.

Table 2. Comparison between related *Succinea* species.

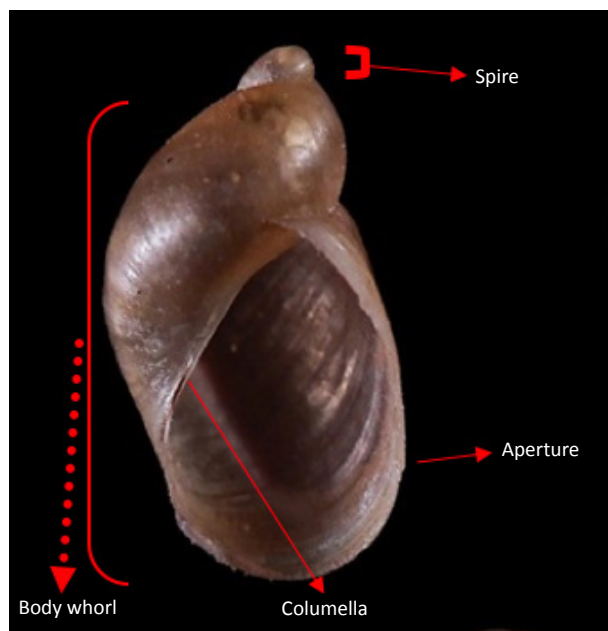
Characteristics	<i>Succinea daucina</i> Pfeiffer, 1855	<i>Succinea putris</i> Linnæus, 1758 (Prokhorova et al. 2020; Barman et al. 2021; www.animalbase)	<i>Succinea baconi</i> Pfeiffer, 1854 (Barman et al. 2021)
Shell shape	Broader, ovate to elliptical shell; more pointed.	Conispiral.	More elongated and tapered shell.
Number of whorls	3	3–4	NA
Body whorl	The body whorl is disproportionately large.	Most of the shell is made up by the last whorl, which opens with a large oval aperture strongly tapering near the columella.	More balanced whorl structure.
Surface texture	Smooth, glossy shell with minimal micro sculpture.		Fine growth lines and subtle striations.
Columellar structure	Slightly twisted columella without a visible fold (pronounced).	Relatively simple and unpronounced.	Moderately twisted, with a subtle fold, more pronounced than in <i>Succinea putris</i> .
Shell colour	Pale yellow to white, with a glossy finish without streaks	Amber yellow with a reddish hue	Amber color with streaks generally yellow or greyish.

for the specimens ($n=10$). Specimens' shell height (H) varied from 5.5–8.8 (Table 1). Spire ratio varied between 0.02–0.18 mm (mean $\pm$ SD = 0.09 $\pm$ 0.04) (Table 1). Three whorls are present, increasing in size at the base. The observed specimens of *Succinea daucina* were found to have a smooth and slightly convex profile. The body whorl of *S. daucina* is disproportionately large, which is a typical characteristic of snails in the Succineidae family. The body whorl is inflated and occupies most of the shell's volume, making the aperture relatively large compared to the overall shell size. The edge of the shell

was thin, while its surface texture was smooth, glossy, and translucent. The specimen exhibited an oval to conical body. These specimens of *S. daucina* had a slightly twisted columella without a visible fold. Fine and subtle growth lines were also seen on the specimens. There was a lack of prominent microsculpture on the obtained shells. The color of the observed specimens was pale honey color to pale white in dry form. A labelled diagram of the diagnostic feature of the collected specimen is presented in Image 4. Some comparisons are also made between related species of *Succinea*, which helps in the

Table 3. The distribution pattern of Amber Snails *Succinea daucina* Pfeiffer, 1855.

	Species	Locality	References
1	<i>Succinea daucina</i> Pfeiffer, 1855	Calcutta [=Kolkata]	Pfeiffer (1855 ["1854"])
2	<i>Succinea daucina</i> Pfeiffer, 1855	Calcutta and Port Canning, West Bengal, India	Rao (1924)
3	<i>Succinea daucina</i> f. <i>hraswasikhara</i> Rao, 1924	Madras, India	Rao (1924)
4	<i>Succinea daucina</i> f. <i>burmanica</i> Rao, 1928	Hsenwi and Old Lashio, Burma [= Myanmar]	Rao (1928)
5	<i>Succinea daucina</i> Pfeiffer, 1855	Gopal chak, Contai, West Bengal, India.	Raut et al. (1997)
6	<i>Succinea daucina</i> Pfeiffer, 1855	Ampinagar, Tripura, India	Mookherjee et al. (2000)
7	<i>Succinea daucina</i> Pfeiffer, 1855	West Bengal, Myanmar	Mitra et al. (2004)
8	<i>Succinea daucina</i> Pfeiffer, 1855	Kolkata, West Bengal, India	Nandy et al. (2022)

**Image 4. Diagnostic features of the collected specimen of *Succinea daucina*. © Dipty Kumari.**

identification of this particular species (Table 2). Two infraspecifics, *Succinea daucina* f. *burmanica* Rao 1928 from “Hsenwi and Old Lashio,” Burma [=Myanmar]; and *Succinea daucina* f. *hraswasikhara* Rao 1924 from “Madras” have been described, which are now considered synonyms of *S. daucina* (Table 3).

Moreover, the presence of *S. daucina* in Patna, Bihar, is not surprising and may have resulted from active dispersal through forest connectivity. All the locations are present in the same eastern zone of Indian boundaries, and with the present record, it is apparent that *S. daucina* is leading its way across boundaries, indicating its existence in urban cities. The existence of *S. daucina* cannot be denied from the border area across Bihar. Thus, extensive surveys are required to get

a current update on the population of *S. daucina* which would further aid in understanding the distribution pattern of the species.

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