



## STUDIES ON LAND AND FRESHWATER MOLLUSCS IN THE COLLECTION OF WESTERN GHAT REGIONAL CENTRE, ZOOLOGICAL SURVEY OF INDIA, KOZHIKODE

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### INTRODUCTION

Molluscs dwelling on land belong to the class Gastropoda and those inhabiting in freshwater are represented by the classes Gastropoda and Bivalvia. About 24000 species of land molluscs and 7000 species of freshwater molluscs are known to science (Lydeard *et al.*, 2004). In India, 1129 species of land molluscs (Ramakrishna *et al.*, 2010) and 208 species of freshwater molluscs (Ramakrishna and Dey, 2007; Köhler & Glaubrecht, 2007; Reid *et al.*, 2013) are so far reported.

Western Ghats, a global biodiversity hotspot, has 269 land molluscs (with 75% endemic species) and 65 freshwater molluscs (with about 39% endemic species) (Mavinkurve *et al.*, 2004a; Aravind *et al.*, 2005; Köhler & Glaubrecht, 2007; Reid *et al.*, 2013). Nonetheless, molluscs particularly land snails of Western Ghats are by and large unknown or understudied or with scanty information (Mavinkurve *et al.*, 2004a). Among the several reasons for poor documentation of species diversity in the Western Ghats, major causes are inaccessibility to remote areas and poor sampling efforts. For example, Köhler & Glaubrecht (2007) described 2 new pachychilid snails from Krishna River drainage system in Karnataka while Reid *et al.* (2013) described six new species of freshwater littorinid snail from a single drainage system (linear distance of 80 km)

of Western Ghats from the same state. Another reason for scanty records of molluscs in the Western Ghats is poorly studied or unstudied museum specimens particularly that of the Western Ghat Regional Centre of Zoological Survey of India. Therefore, we attempted to study land and freshwater molluscs deposited at the National Zoological Collections (NZC) of Western Ghat Regional Centre (WGRC), Zoological Survey of India (ZSI), Kozhikode.

Important systematic contributions on land and freshwater molluscs of India including Western Ghats were that of Benson (1836), Blanford (1870 & 1880), Beddome (1875 & 1891), Blanford and Godwin Austen (1908), Gude (1914 & 1921), Preston (1915), Annandale and Rao (1925), Rao (1925), Subba Rao (1989), Mitra *et al.* (2005) and Ramakrishna and Dey (2007). Moreover, many catalogues and checklists have been prepared reporting land and freshwater molluscs of India (Theobald, 1860, 1876; Mitchell, 1867; Nevill, 1877, 1878, 1884; Satyamurti, 1960; Ramakrishna *et al.*, 2010) besides that of Karnataka (Mavinkurve *et al.*, 2004b) and Maharashtra (Patil & Talmale, 2005).

### MATERIAL AND METHODS

The National Zoological Collections of Western Ghat Regional Centre, Kozhikode hold about

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1049 specimens of land and freshwater molluscs (including 20 type material: 6 holotype specimens and 13 paratype specimens) collected mainly from the Western Ghats of Karnataka, Kerala, Maharashtra and Tamil Nadu states during the period of 33 years from 1981 to 2013. Molluscan specimens were identified following Subba Rao (1989), Mitra *et al.* (2005), Ramakrishna and Dey (2007) and Reid *et al.* (2013). The classification systems of gastropod and bivalve families followed here are according to Bouchet and Rocroi (2005; 2010). However, the phylogenetic arrangement of the suprageneric taxa is according to Poppe & Tagaro (2006) for gastropods and according to Carter *et al.* (2011) for bivalves.

The following abbreviations are used: Coll.: Collector; dist.: district; INV: Invertebrate; IR: Identified Register; N.P.: National Park; NZC: National Zoological Collections; R.F.: Reserve Forest; T.R.: Tiger Reserve; W.L.S.: Wildlife Sanctuary; WGRC: Western Ghat Regional Centre; ZSI: Zoological Survey of India.

#### SYSTEMATIC LIST

##### Land molluscs:

- Phylum MOLLUSCA  
Class GASTROPODA  
Subclass CAENOGASTROPODA  
Order unassigned CAENOGASTROPODA  
Superfamily CYCLOPHOROIDEA  
Family CYCLOPHORIDAE  
Subfamily CYCLOPHORINAE
- Cyclophorus (Litostylus) nilagiricus* (Benson, 1852)  
Subclass HETEROBRANCHIA  
Order STYLOMMATOPHORA  
Superfamily ACHATINOIDEA  
Family ACHATINIDAE  
Subfamily ACHATININAE
  - Achatina (Lissachatina) fulica* (Bowdich, 1822)

##### Superfamily PLECTOPYLOIDEA

###### Family PLECTOPYLIDAE

- Corilla anax* (Benson, 1865)

##### Superfamily HELICARIONOIDEA

###### Family ARIOPHANTIDAE

###### Subfamily ARIOPHANTINAE

- Euplecta subcastor* (Beddome, 1891)
- Hemiplecta basileus* (Benson, 1861)
- Indrella ampulla* (Benson, 1850)

##### Freshwater molluscs:

- Phylum MOLLUSCA  
Class GASTROPODA  
Subclass CAENOGASTROPODA  
Order unassigned CAENOGASTROPODA  
Superfamily AMPULLARIOIDEA  
Family AMPULLARIIDAE  
Subfamily AMPULLARIINAE
- Pila virens* (Lamarck, 1822)  
Superfamily VIVIPAROIDEA  
Family VIVIPARIDAE  
Subfamily VIVIPARINAE
  - Bellamyia bengalensis* (Lamarck, 1822)
  - Bellamyia dissimilis* (Müller, 1774)  
Superfamily CERITHIOIDEA  
Family PACHYCHILIDAE
  - Paracrostoma huegelii* (Philippi, 1843)  
Family PALUDOMIDAE  
Subfamily PALUDOMINAE
  - Paludomus (Paludomus) annandalei* Preston, 1909
  - Paludomus (Philopotamis) sulcatus* Reeve, 1847
  - Paludomus (Tanalia) neritoides* Reeve, 1847  
Family THIARIDAE  
Subfamily THIARINAE
  - Melanoides tuberculata* (Müller, 1774)
  - Tarebia granifera* (Lamarck, 1822)

16. *Thiara (Thiara) scabra* (Müller, 1774)

Superfamily LITTORINOIDEA

Family LITTORINIDAE

Subfamily LACUNINAE

17. *Cremnoconchus agumbensis* Reid, Aravind & Madhyastha, 2013

18. *Cremnoconchus canaliculatus* Blanford, 1870

19. *Cremnoconchus castanea* Reid, Aravind & Madhyastha, 2013

20. *Cremnoconchus cingulatus* Reid, Aravind & Madhyastha, 2013

21. *Cremnoconchus conicus* Blanford, 1870

22. *Cremnoconchus dwarakii* Reid, Aravind & Madhyastha, 2013

23. *Cremnoconchus globulus* Reid, Aravind & Madhyastha, 2013

24. *Cremnoconchus hanumani* Reid, Aravind & Madhyastha, 2013

25. *Cremnoconchus syhadrensis* (Blanford, 1863)

Subclass HETEROBRANCHIA

Order HYGROPHILA

Superfamily LYMNAEOIDEA

Family LYMNAEIDAE

Subfamily LYMNAEINAE

26. *Radix luteola* (Lamarck, 1822)

Superfamily PLANORBOIDEA

Family PLANORBIDAE

Subfamily BULININAE

27. *Indoplanorbis exustus* (Deshayes, 1834)

Class BIVALVIA

Subclass PALAEOHETERODONTA

Order UNIONOIDA

Superfamily UNIONOIDEA

Family UNIONIDAE

Subfamily AMBLEMINAE

28. *Lamellidens consobrinus* (Lea, 1859)

29. *Lamellidens marginalis* (Lamarck, 1819)

Subfamily PARREYSIINAE

30. *Parreysia (Parreysia) corrugata* (Müller, 1774)

## SYSTEMATIC ACCOUNT

### 1. *Cyclophorus (Litostylus) nilagiricus*

(Benson, 1852)

(Plate-I, Figs. 1–3)

1852. *Cyclostoma nilagiricum* Benson, *Ann. Mag. nat. Hist.*, Ser. 2, X : 268.

2005. *Cyclophorus (Litostylus) nilagiricus* Mitra, Dey and Ramakrishna, *Pictorial Handbook-Indian Land Snails* : 52.

*Material examined*: 2 ex., Kakkayam, Kozhikode dist., Kerala, 07. 10. 1982, Coll. K.N. Nair, ZSI/WGRC/IR/INV/2884.

*Distribution* : India : Western Ghats (Endemic): Kerala.

### 2. *Achatina (Lissachatina) fulica*

(Bowdich, 1822)

(Plate-I, Figs. 4, 5)

1822. *Achatina fulica* Bowdich, *Elements of Conchology, part I. Univalves* : pl. 13, fig. 3.

2005. *Achatina (Lissachatina) fulica* Mitra, Dey and Ramakrishna, *Pictorial Handbook-Indian Land Snails* : 166.

*Material examined*: 1 ex., Chulliyar, Palakkad dist., Kerala, 23. 03. 1999, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2785.

*Distribution*: India: Found throughout the country (including Andaman Islands) except north-west region. *Elsewhere* : American Samoa, Argentina, Bangladesh, Barbados, Bolivia, Brazil, Brunei Darussalam, Cambodia, Caribbean, Central African Republic, China, Christmas Island, Colombia, Cote d'Ivoire, Ecuador, Fiji, French Polynesia, Guadeloupe, Guam, Indonesia, Japan, Kenya, Kiribati, Madagascar, Malagasy, Malaysia, Maldives, Marshall Islands, Martinique, Mauritius, Micronesia, Morocco, Myanmar, New Caledonia, New Zealand, Nigeria, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Paraguay, Peru, Philippines, Saint Lucia, Samoa, Seychelles,

Singapore, Solomon Islands, Sri Lanka, Taiwan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tuvalu, United States Virgin Islands, US Minor Outlying Islands, USA, Vanuatu, Venezuela, Vietnam, Wallis and Futuna, West Africa and Zanzibar.

### 3. *Corilla anax* (Benson, 1865)

(Plate-I, Figs. 6–8)

1865. *Helix anax* Benson, *Ann. Mag. nat. Hist.*, Ser. 3, **XV**: 12.

2005. *Corilla anax* Mitra, Dey and Ramakrishna, *Pictorial Handbook-Indian Land Snails* : 187.

*Material examined*: 1 ex., Sholayar R.F., Thrissur dist., Kerala, 21. 02. 1996, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2831.

*Distribution*: India: Hills of South India including Kerala. *Elsewhere* : Sri Lanka.

### 4. *Euplecta subcastor* (Beddome, 1891)

(Plate-I, Figs. 9–11)

1891. *Nanina subcastor* Beddome, *Proc. zool. Soc. London* : 313, pl. XXIX, fig. 1–3.

2005. *Euplecta subcastor* Mitra, Dey and Ramakrishna, *Pictorial Handbook-Indian Land Snails* : 239.

*Material examined*: 1 ex., Athirapally, Thrissur dist., Kerala, 23. 02. 1996, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2870.

*Distribution*: India: Western Ghats : Kerala and Tamil Nadu.

### 5. *Hemiplecta basileus* (Benson, 1861)

(Plate-I, Figs. 12–14)

1861. *Helix basileus* Benson, *Ann. Mag. nat. Hist.*, Ser. 3, **VII** : 81.

2005. *Hemiplecta basileus* Mitra, Dey and Ramakrishna, *Pictorial Handbook-Indian Land Snails* : 241.

*Material examined*: 1 ex., Varakiliyar, Anaimalai, Coimbatore dist., Tamil Nadu, 12. 12. 1983, Coll. G.U. Kurup & Party, ZSI/WGRC/IR/INV/2840; 3 ex., Manjapara, Malayattor, Divi, Ernakulam dist., Kerala, 15. 11. 1999, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2841; 1 ex., Thattekkad, Ernakulam dist., Kerala, 02. 12. 2006, Coll. K. Rajmohana, ZSI/WGRC/IR/INV/2839 and 3 ex., Mannavan Shola, Eravikulam N.P.,

Idukki dist., Kerala, 06. 04. 2012, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2947.

*Distribution*: India: Western Ghats : Kerala and Tamil Nadu.

### 6. *Indrella ampulla* (Benson, 1850)

(Plate-I, Figs. 15, 16)

1850. *Helix ampulla* Benson, *Ann. Mag. nat. Hist.*, Ser. 2, **V** : 213.

2005. *Indrella ampulla* Mitra, Dey and Ramakrishna, *Pictorial Handbook-Indian Land Snails* : 243.

*Material examined*: 2 ex., Periyar Peak, Wayanad dist., Kerala, 15. 08. 1994, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2880; 1 ex., Thusaragiri, Kodanchery, Kozhikode dist., Kerala, 22. 06. 1995, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2882; 2 ex., Anakkampoyil, Kozhikode dist., Kerala, 17. 07. 1995, Coll. Promod, ZSI/WGRC/IR/INV/2881; 1 ex., Sholayar R.F., Thrissur dist., Kerala, 21. 02. 1996, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2830; 1 ex., Kapayem, Kuttampuzha R.F., Ernakulam dist., Kerala, 19. 11. 1999, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2885; 1 ex., Idamalayar/Keerithodu, Ernakulam dist., Kerala, 20. 11. 1999, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2883; 1 ex., Kakkad, Engapuzha, Kozhikode dist., Kerala, 20. 10. 2009, Coll. K.G. Emiliyamma, ZSI/WGRC/IR/INV/2879 and 1 ex., Ambalapara, Kakkayam, Malabar W.L.S., Kozhikode dist., Kerala, 29. 05. 2013, Coll. K.G. Emiliyamma, ZSI/WGRC/IR/INV/2944.

*Distribution*: India: Western Ghats : Kerala and Tamil Nadu.

### 7. *Pila virens* (Lamarck, 1822)

(Plate-II, Figs. 1, 2)

1822. *Ampullaria virens* Lamarck, *Hist. nat. Anim. Sans Vert.*, **6**(2): 179.

2007. *Pila virens* Ramakrishna & Dey, *Handbook on Indian Freshwater Molluscs* : 105.

*Material examined*: 11 ex., Nedupuzha, Trichur, Thrissur dist., Kerala, 20. 02. 1985, Coll. K.N. Nair, ZSI/WGRC/IR/INV/2773; 1 ex., Maduyikavu, Kannur dist., Kerala, 23. 11. 1994, Coll. K.C. Gopi, ZSI/WGRC/IR/INV/2846;



1 ex., Vazhani, Thrissur dist., Kerala, 07. 10. 1995, Coll. K.C. Gopi, ZSI/WGRC/IR/INV/2843; 10 ex., Kainakari, Alappuzha dist., Kerala, 24. 02. 2000, Coll. K.C. Gopi, ZSI/WGRC/IR/INV/2786; 1 ex., Kidangoor/Periyar, Kottayam dist., Kerala, 30. 10. 2000, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2851; 1 ex., Thavanakkadavu, Vaikom, Ernakulam dist., Kerala, 26. 06. 2002, Coll. K.C. Gopi, ZSI/WGRC/IR/INV/2842; 3 ex., Madayipara, Kannur dist., Kerala, 22. 07. 2004, Coll. Md. Jaffer Palot, ZSI/WGRC/IR/INV/2837 and 9 ex., Thattekkad, Ernakulam dist., Kerala, 02. 12. 2006, Coll. K. Rajmohana, ZSI/WGRC/IR/INV/2838.

*Distribution*: India : Andhra Pradesh, Assam?, Karnataka, Kerala, Maharashtra and Tamil Nadu.

#### 8. *Bellamyia bengalensis* (Lamarck, 1822)

(Plate-II, Figs. 3, 4)

1822. *Paludina bengalensis* Lamarck, *Hist. nat. Anim. Sans Vert.*, **6**(2) : 174.

2007. *Bellamyia bengalensis* Ramakrishna and Dey, *Handbook on Indian Freshwater Molluscs* : 78.

*Material examined*: 3 ex., Nedupuzha, Trichur, Thrissur dist., Kerala, 20. 02. 1985, Coll. K.N. Nair, ZSI/WGRC/IR/INV/2774; 10 ex., Bharathapuzha, Kalpathi, Palakkad dist., Kerala, 22. 02. 1985, Coll. K.N. Nair, ZSI/WGRC/IR/INV/2821; 1 ex., Kidangoor/Periyar, Kottayam dist., Kerala, 30. 10. 2000, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2852 and 1 ex., Velloor, Kottayam dist., Kerala, 31. 10. 2000, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2817.

*Distribution*: India: Common throughout the country including Kerala. *Elsewhere* : Bangladesh, Iran, Myanmar, Nepal, Pakistan and Sri Lanka.

#### 9. *Bellamyia dissimilis* (Müller, 1774)

(Plate-II, Figs. 5, 6)

1774. *Nerita dissimilis* Müller, *Verm. Terr. et Fluv.*, **2**: 184.

2007. *Bellamyia dissimilis* Ramakrishna and Dey, *Handbook on Indian Freshwater Molluscs* : 90.

*Material examined*: 8 ex., Chulliyar, Palakkad dist., Kerala, 23. 03. 1999, Coll. P.M. Sureshan,

ZSI/WGRC/IR/INV/2782 and 7 ex., Velloor, Kottayam dist., Kerala, 31. 10. 2000, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2818.

*Distribution*: India : Common throughout the country including Kerala. *Elsewhere* : Bangladesh, Malaysia, Myanmar, Pakistan, Sri Lanka and Thailand.

#### 10. *Paracrostoma huegelii* (Philippi, 1843)

(Plate-II, Figs. 7, 8)

1843. *Melania hügelii* Philippi, *Abbild. Beschreib. Conch.* **1**: 61.

2007. *Sulcospira huegeli* Ramakrishna and Dey, *Handbook on Indian Freshwater Molluscs* : 174.

2007. *Paracrostoma huegelii* Köhler & Glaubrecht, *Biol. J. Linn. Soc.*, **91**: 630.

*Material examined*: 8 ex., Thakarapadi Forest Area, Kozhikode dist., Kerala, 05. 10. 1981, Coll. K.N. Nair & Party, ZSI/WGRC/IR/INV/2826; 8 ex., Mananthavady, Bavali River, Wayanad dist., Kerala, 16. 03. 1982, Coll. K.N. Nair & Party, ZSI/WGRC/IR/INV/2819; 18 ex., Thalayad, Kozhikode dist., Kerala, 18. 04. 1983, Coll. K.N. Nair & Party, ZSI/WGRC/IR/INV/2778; 10 ex., Bethri, Coorg, Kodagu dist., Karnataka, 05. 01. 1985, Coll. K.N. Nair & Party, ZSI/WGRC/IR/INV/2771; 1 ex., Bethri, Coorg, Kodagu dist., Karnataka, 05. 01. 1985, Coll. K.N. Nair & Party, ZSI/WGRC/IR/INV/2860; 6 ex., Sampaje, Kodagu dist., Karnataka, 07. 01. 1985, Coll. K.N. Nair & Party, ZSI/WGRC/IR/INV/2834; 29 ex., Harangi, Kodagu dist., Karnataka, 16. 01. 1985, Coll. K.N. Nair, ZSI/WGRC/IR/INV/2777; 25 ex., Mykayam, Kasaragod dist., Kerala, 27. 01. 1994, Coll. K.C. Gopi, ZSI/WGRC/IR/INV/2825; 10 ex., Vattapoil, Kannur dist., Kerala, 02. 03. 1994, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2829; 16 ex., Solley Kolley, Kodagu dist., Karnataka, 06. 03. 1994, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2789; 2 ex., Rodiyar, Kanyakumari dist., Tamil Nadu, 02. 05. 1994, Coll. K.N. Nair, ZSI/WGRC/IR/INV/2862; 15 ex., Kottiyour, Kannur dist., Kerala, 03. 02. 1995, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2945; 6 ex., Kottiyour, Kannur dist., Kerala, 22. 02. 1995, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2948; 10 ex.,

Thellickal, Parambikulam W.L.S., Palakkad dist., Kerala, 15. 03. 1996, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2769; 2 ex., Bhagavathi Nature Camp, Kudremukh, Chikkamagaluru dist., Karnataka, 24. 10. 2005, Coll. K. Rajmohana, ZSI/WGRC/IR/INV/2853; 55 ex., Kurukkathodu, Aralam W.L.S., Kannur dist., Kerala, 28. 02. 2006, Coll. K. Rajmohana, ZSI/WGRC/IR/INV/2781; 20 ex., Kottencheri R.F., Kasaragod dist., Kerala, 05. 03. 2006, Coll. K. Rajmohana, ZSI/WGRC/IR/INV/2768; 50 ex., Kakkad, Engapuzha, Kozhikode dist., Kerala, 20. 10. 2009, Coll. K.G. Emiliyamma, ZSI/WGRC/IR/INV/2779; 20 ex., Meenmutti, Aralam W.L.S., Kannur dist., Kerala, 12. 10. 2011, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2772; 13 ex., Ambalappara, Kakkayam, Malabar W.L.S., Kozhikode dist., Kerala, 09. 05. 2013, Coll. K.G. Emiliyamma, ZSI/WGRC/IR/INV/2942; 21 ex., Kakkayam, Malabar W.L.S., Kozhikode dist., Kerala, 22. 05. 2013, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2941 and 23 ex., Athikode, Kakkayam, Malabar W.L.S., Kozhikode dist., Kerala, 29. 05. 2013, Coll. K.G. Emiliyamma, ZSI/WGRC/IR/INV/2943.

*Distribution*: India : South India (including Western Ghats) : Karnataka, Kerala and Tamil Nadu.

*Remarks*: Records from Assam and Meghalaya (Garo and Khasi Hills) (Ramakrishna & Dey, 2007) is incorrect since the species is endemic to south India (Köhler & Glaubrecht, 2007).

#### 11. *Paludomus (Paludomus) annandalei*

Preston, 1909

(Plate-II, Figs. 9, 10)

1909. *Paludomus annandalei* Preston, *Rec. Ind. Mus.*, III(III) : 277.

2007. *Paludomus (Paludomus) annandalei* Ramakrishna and Dey, *Handbook on Indian Freshwater Molluscs* : 177.

*Material examined*: 1 ex., Bharathapuzha, Kalpathi, Palakkad dist., Kerala, 22. 02. 1985, Coll. K.N. Nair, ZSI/WGRC/IR/INV/2822; 2 ex., Kuruva, Wayanad dist., Kerala, 25. 12. 1994, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2874; 20 ex., Sholayar R.F., Thrissur dist., Kerala, 21.

02. 1996, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2833; 6 ex., Athirapally, Thrissur dist., Kerala, 23. 02. 1996, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2867; 12 ex., Karimala, Parambikulam W.L.S., Palakkad dist., Kerala, 18. 03. 1996, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2765; 1 ex., Parambikulam Tunnel, Parambikulam W.L.S., Palakkad dist., Kerala, 21. 03. 1996, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2857; 2 ex., Mlappara, Periyar T.R., Idukki dist., Kerala, 08. 11. 1996, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2856; 3 ex., Poogemkutti / Naralsemthodu, Ernakulam dist., Kerala, 23. 11. 1999, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2854; 30 ex., Idamaruku, Kottayam dist., Kerala, 29. 10. 2000, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2844; 1 ex., Engapuzha, Kozhikode dist., Kerala, 24. 04. 2002, Coll. K.G. Emiliyamma, ZSI/WGRC/IR/INV/2823; 14 ex., Kakkad, Engapuzha, Kozhikode dist., Kerala, 20. 10. 2009, Coll. K.G. Emiliyamma, ZSI/WGRC/IR/INV/2780 and 120 ex., Mlappara, Periyar T.R., Idukki dist., Kerala, 03. 03. 2010, Coll. K.C. Gopi, ZSI/WGRC/IR/INV/2770.

*Distribution*: India : Western Ghats: Kerala.

#### 12. *Paludomus (Philopotamis) sulcatus*

Reeve, 1847

(Plate-II, Figs. 11, 12)

1847. *Paludomus sulcatus* Reeve, *Conch. Icon.*, 4: pl. 2, fig. 8a, pl.3, figs. 8b, c.

2007. *Paludomus (Philopotamis) sulcatus* Ramakrishna and Dey, *Handbook on Indian Freshwater Molluscs* : 190.

*Material examined*: 15 ex., Naduvathumoozhi, Pathanamthitta dist., Kerala, 22. 01. 1992, Coll. M.B. Raghunatha & Party, ZSI/WGRC/IR/INV/2820; 15 ex., Puliylappara, Vazhachal, Thrissur dist., Kerala, 20. 02. 1996, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2788; 7 ex., Sholayar R.F., Thrissur dist., Kerala, 21. 02. 1996, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2832; 3 ex., Karimala, Parambikulam W.L.S., Palakkad dist., Kerala, 18. 03. 1996, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2766;

7 ex., Poogemkutti/Naralsemethodu, Ernakulam dist., Kerala, 23. 11. 1999, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2855; 24 ex., Ponkunnam, Kottayam dist., Kerala, 27. 10. 2000, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2812 and 2 ex., Karadipara, Athirapally, Thrissur dist., Kerala, 28. 02. 2013, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2939.

*Distribution*: India : Kerala. *Elsewhere* : Sri Lanka.

### 13. *Paludomus (Tanalia) neritoides*

Reeve, 1847

(Plate-II, Figs. 13, 14)

1847. *Paludomus neritoides* Reeve, *Conch. Icon.*, 4: pl. 1, fig. 3a, b.

2007. *Paludomus (Tanalia) neritoides* Ramakrishna and Dey, *Handbook on Indian Freshwater Molluscs*: 194.

*Material examined*: 1 ex., Varakiliyar, Anaimalai, Coimbatore dist., Tamil Nadu, 22. 07. 1988, Coll. G.U. Kurup, ZSI/WGRC/IR/INV/2946; 5 ex., Athirapally, Thrissur dist., Kerala, 23. 02. 1996, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2868 and 16 ex., Karimala, Parambikulam W.L.S., Palakkad dist., Kerala, 18. 03. 1996, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2767.

*Distribution*: India : Kerala and Tamil Nadu. *Elsewhere* : Sri Lanka.

*Remarks* : New record to Tamil Nadu.

### 14. *Melanoides tuberculata* (Müller, 1774)

(Plate-II, Figs. 15, 16)

1774. *Nerita tuberculata* Müller, *Verm. Terr. et Fluv.*, 2: 191.

2007. *Melanoides tuberculata* Ramakrishna and Dey, *Handbook on Indian Freshwater Molluscs* : 161.

*Material examined*: 18 ex., Munderi, Nilambur, Malappuram dist., Kerala, 24. 02. 1992, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2813 and 4 ex., Chulliyar, Palakkad dist., Kerala, 23. 03. 1999, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2783.

*Distribution*: India: Common throughout the country except Jammu and Kashmir. *Elsewhere*:

Algeria, Australia, Bahrain, Bangladesh, Burundi, China, Congo, Egypt, Eritrea, Ethiopia, Iran, Japan, Kenya, Kuwait, Libya, Malawi, Malaysia, Morocco, Mozambique, Namibia, Nepal, Niger, Oman, Qatar, Saudi Arabia, South Africa, Sri Lanka, Sudan, Swaziland, Tanzania, Thailand, Tunisia, United Arab Emirates, Vietnam, Yemen and Zimbabwe.

### 15. *Tarebia granifera* (Lamarck, 1822)

(Plate-III, Figs. 17, 18)

1822. *Melania granifera* Lamarck, *Hist. nat. Anim. Sans Vert.*, 6(2): 167.

2007. *Tarebia granifera* Ramakrishna and Dey, *Handbook on Indian Freshwater Molluscs* : 168.

*Material examined*: 4 ex., Sampaje, Kodagu dist., Karnataka, 07. 01. 1985, Coll. K.N. Nair & Party, ZSI/WGRC/IR/INV/2835; 1 ex., Coorg, Kodagu dist., Karnataka, 14. 02. 1985, Coll. K.N. Nair, ZSI/WGRC/IR/INV/2875 and 3 ex., Kuruva, Wayanad dist., Kerala, 25. 12. 1994, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2872.

*Distribution*: India : Andaman and Nicobar, Andhra Pradesh, Bihar, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Odisha, Tripura, and West Bengal. *Elsewhere*: Bangladesh, Bhutan, Cambodia, China, Cuba, French Polynesia, Hong Kong, Indonesia, Japan, Madagascar, Malaysia, Myanmar, Nepal, Papua New Guinea, Philippines, Singapore, South Africa, Sri Lanka, Taiwan, Thailand, United States of America, Venezuela and Vietnam.

*Remarks*: New records to Karnataka and Kerala.

### 16. *Thiara (Thiara) scabra* (Müller, 1774)

(Plate-III, Figs. 19, 20)

1774. *Buccinum scabrum* Müller, *Verm. Terr. et Fluv.*, 2: 136.

2007. *Thiara (Thiara) scabra* Ramakrishna and Dey, *Handbook on Indian Freshwater Molluscs* : 153.

*Material examined*: 1 ex., Coorg, Kodagu dist., Karnataka, 14. 02. 1985, Coll. K.N. Nair, ZSI/WGRC/IR/INV/2876; 1 ex., Munderi, Nilambur,

Malappuram dist., Kerala, 24. 02. 1992, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2814 and 15 ex., Valayar, Palakkad dist., Kerala, 18. 03. 1999, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2865.

*Distribution*: India: Bihar, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Puducherry, Sikkim, Tamil Nadu, Uttaranchal, Uttar Pradesh and West Bengal. *Elsewhere*: Bangladesh, Fiji, Guam, Indonesia, Iran, Japan, Kenya, Malaysia, Mauritius, Micronesia, Myanmar, Nepal, New Caledonia, Papua New Guinea, Philippines, Samoa, Seychelles, Solomon Islands, Tanzania, Thailand, Timor, Vanuatu and Yemen.

17. *Cremnoconchus agumbensis* Reid, Aravind & Madhyastha, 2013

(Plate-III, Figs. 21, 22)

2013. *Cremnoconchus agumbensis* Reid, Aravind & Madhyastha, *Zool. J. Linn. Soc.*, **167**: 121.

*Material examined*: Holotype, 1 ex., Agumbe, Udupi dist., Karnataka, 13. 10. 2010, Coll. N.A. Aravind & N.A. Madhyastha, ZSI/WGRC/IR/INV/2313 and paratypes, 2 ex., ZSI/WGRC/IR/INV/2314, 2315, same data as holotype.

*Distribution*: India : Western Ghats : Karnataka (Udupi).

*Remarks*: Family Littorinidae Children, 1834 is almost exclusively marine but for the freshwater genus *Cremnoconchus* Blanford, 1869. The genus and its species are restricted to streams of the Western Ghats in India (Reid *et al.*, 2013).

18. *Cremnoconchus canaliculatus*

Blanford, 1870

(Plate-III, Figs. 23, 24)

1870. *Cremnoconchus conicus* var. *canaliculatus* Blanford, *J. Asiat. Soc. Bengal*, **XXXIX**(II) : 11.

2013. *Cremnoconchus canaliculatus* Reid, Madhyastha & Aravind, *Zool. J. Linn. Soc.*, **167**: 116.

*Material examined*: 1 ex., 5 km south of Mahabaleshwar, Satara dist., Maharashtra, 15. 10. 2010, Coll. N.A. Aravind, ZSI/WGRC/IR/INV/2302; 2 ex., 10 km west of Mahabaleshwar,

Raigad dist., Maharashtra, 16. 10. 2010, Coll. N.A. Aravind, ZSI/WGRC/IR/INV/2300 & ZSI/WGRC/IR/INV/2301 and 1 ex., Dongarwadi, Tamhini, Pune dist., Maharashtra, date of collection unknown, Coll. N.A. Aravind, ZSI/WGRC/IR/INV/2299.

*Distribution*: India: Western Ghats: Maharashtra (Pune, Raigad and Satara).

19. *Cremnoconchus castanea* Reid, Aravind & Madhyastha, 2013

(Plate-III, Figs. 25, 26)

2013. *Cremnoconchus castanea* Reid, Aravind & Madhyastha, *Zool. J. Linn. Soc.*, **167**: 126.

*Material examined*: Holotype, 1 ex., Belkal Thirtha Falls, Udupi dist., Karnataka, 16. 03. 2008, Coll. N.A. Aravind, ZSI/WGRC/IR/INV/2321; paratype, 1 ex., ZSI/WGRC/IR/INV/2320, same data as holotype and 1 ex., locality unknown, district unknown, Karnataka, date of collection unknown, Coll. N.A. Aravind, ZSI/WGRC/IR/INV/2322.

*Distribution*: India : Western Ghats : Karnataka (Udupi).

20. *Cremnoconchus cingulatus* Reid, Aravind & Madhyastha, 2013

(Plate-III, Figs. 27, 28)

2013. *Cremnoconchus cingulatus* Reid, Aravind & Madhyastha, *Zool. J. Linn. Soc.*, **167**: 124.

*Material examined*: Holotype, 1 ex., Hulikal Ghat, Udupi dist., Karnataka, 13. 10. 2010, Coll. N.A. Aravind & N.A. Madhyastha, ZSI/WGRC/IR/INV/2316 and paratypes, 3 ex., ZSI/WGRC/IR/INV/2317, 2318, 2319, same data as holotype.

*Distribution*: India : Western Ghats : Karnataka (Udupi).

21. *Cremnoconchus conicus* Blanford, 1870

(Plate-III, Figs. 29, 30)

1870. *Cremnoconchus conicus* Blanford, *J. Asiat. Soc. Bengal*, **XXXIX**(II) : 10.

2013. *Cremnoconchus conicus* Reid, Madhyastha & Aravind, *Zool. J. Linn. Soc.*, **167**: 111.

*Material examined*: 1 ex., 6 km west of



Mahabaleshwar, Satara dist., Maharashtra, 16. 10. 2010, Coll. N.A. Aravind, ZSI/WGRC/IR/INV/2295 and 3 ex., 44 km west of Bhor, Pune dist., Maharashtra, 16. 10. 2010, Coll. N.A. Aravind, ZSI/WGRC/IR/INV/2296, 2297, 2298.

*Distribution*: India: Western Ghats: Maharashtra (Pune and Satara).

22. *Cremnoconchus dwarakii* Reid, Aravind & Madhyastha, 2013

(Plate-III, Figs. 31, 32)

2003. *Cremnoconchus syhadrensis* Williams, Reid & Littlewood, *Mol. Phylogenet. Evol.*, **28**: 63 (not *Cremnoconchus syhadrensis* Blanford, 1863).

2013. *Cremnoconchus dwarakii* Reid, Aravind & Madhyastha, *Zool. J. Linn. Soc.*, **167**: 128.

*Material examined*: Holotype, 1 ex., Hulikal Ghat, Udupi dist., Karnataka, 13. 10. 2010, Coll. N.A. Aravind & N.A. Madhyastha, ZSI/WGRC/IR/INV/2323 and paratypes, 4 ex., ZSI/WGRC/IR/INV/2324, 2325, same data as holotype.

*Distribution*: India: Western Ghats: Karnataka (Udupi).

23. *Cremnoconchus globulus* Reid, Aravind & Madhyastha, 2013

(Plate-IV, Figs. 1, 2)

2013. *Cremnoconchus globulus* Reid, Aravind & Madhyastha, *Zool. J. Linn. Soc.*, **167**: 121.

*Material examined*: Holotype, 1 ex., Lesser Kadambi Falls, Kudremukh National Park, Chikkamagaluru dist., Karnataka, 12. 10. 2010, Coll. N.A. Aravind & N.A. Madhyastha, ZSI/WGRC/IR/INV/2310; paratypes, 2 ex., ZSI/WGRC/IR/INV/2311, 2312, same data as holotype and 2 ex., Greater Kadambi Falls, Kudremukh National Park, Chikkamagaluru dist., Karnataka, 12. 10. 2010, Coll. N.A. Aravind & N.A. Madhyastha, ZSI/WGRC/IR/INV/2308, 2309.

*Distribution*: India: Western Ghats: Karnataka (Chikkamagaluru).

24. *Cremnoconchus hanumani* Reid, Aravind & Madhyastha, 2013

(Plate-IV, Figs. 3, 4)

2013. *Cremnoconchus hanumani* Reid, Aravind & Madhyastha, *Zool. J. Linn. Soc.*, **167**: 118.

*Material examined*: Holotype, 1 ex., Hanuman Gundi Falls, Kudremukh National Park, Chikkamagaluru dist., Karnataka, 12. 10. 2010, Coll. N.A. Aravind & N.A. Madhyastha, ZSI/WGRC/IR/INV/2303; paratype, 1 ex., ZSI/WGRC/IR/INV/2304, same data as holotype and 3 ex., Greater Kadambi Falls, Kudremukh National Park, Chikkamagaluru dist., Karnataka, 12. 10. 2010, Coll. N.A. Aravind & N.A. Madhyastha, ZSI/WGRC/IR/INV/2305, 2306, 2307.

*Distribution*: India: Western Ghats: Karnataka (Chikkamagaluru).

25. *Cremnoconchus syhadrensis*

(Blanford, 1863)

(Plate-IV, Figs. 5, 6)

1863. *Cremnobates syhadrensis* Blanford, *Ann. Mag. Nat. Hist.*, (3)**XII**: 184.

2013. *Cremnoconchus syhadrensis* Reid, Madhyastha & Aravind, *Zool. J. Linn. Soc.*, **167**: 103.

*Material examined*: 2 ex., Matheran, Raigad dist., Maharashtra, 17. 10. 2010, Coll. N.A. Aravind, ZSI/WGRC/IR/INV/2290, 2291 and 3 ex., Khandala, Pune dist., Maharashtra, 17. 10. 2010, Coll. N.A. Aravind, ZSI/WGRC/IR/INV/2292, 2293, 2294.

*Distribution*: India: Western Ghats: Maharashtra (Nashik, Pune and Raigad).

*Remarks*: Type locality was corrected to Matheran by Reid *et al.* (2013) from Khandala earlier mentioned by Subba Rao & Mitra (1979).

26. *Radix luteola* (Lamarck, 1822)

(Plate-IV, Figs. 7, 8)

1822. *Lymnaea luteola* Lamarck, *Hist. nat. Anim. Sans Vert.*, **6**(2): 160.

2007. *Lymnaea (Pseudosuccinea) luteola* Ramakrishna and Dey, *Handbook on Indian Freshwater Molluscs*: 208.

2010. *Radix luteola* Correa, Escobar, Durand, Renaud, David, Jarne, Pointier & Hurtrez-Boussès, *BMC Evolutionary Biology*, **10**: 381.

*Material examined*: 1 ex., Sampaje, Kodagu dist., Karnataka, 07. 01. 1985, Coll. K.N. Nair

& Party, ZSI/WGRC/IR/INV/2836 and 4 ex., Hipla/Hebbae, Muthodi Range, Bhadra W.L.S., Chikkamagaluru dist., Karnataka, 12. 11. 2006, Coll. K.G. Emiliyamma, ZSI/WGRC/IR/INV/2828.

*Distribution:* India: Common throughout the country including Karnataka. *Elsewhere:* Bangladesh, China, Iran, Malaysia, Myanmar, Pakistan, Sri Lanka and Thailand.

**27. *Indoplanorbis exustus*** (Deshayes, 1834)

(Plate-IV, Figs. 9–11)

1834. *Planorbis exustus* Deshayes, in Bélanger, *Voy. Ind. Orient. Zool.*: 417.

2007. *Indoplanorbis exustus* Ramakrishna and Dey, *Handbook on Indian Freshwater Molluscs*: 208.

*Material examined:* 95 ex., Mercara (Madikeri), State Fisheries Office Tank, Kodagu dist., Karnataka, 05. 01. 1985, Coll. K.N. Nair & Party, ZSI/WGRC/IR/INV/2787; 20 ex., Maduyikavu, Kannur dist., Kerala, 23. 11. 1994, Coll. K.C. Gopi, ZSI/WGRC/IR/INV/2847; 3 ex., Kuruva, Wayanad dist., Kerala, 25. 12. 1994, Coll. C. Radhakrishnan, ZSI/WGRC/IR/INV/2873; 15 ex., Velloor, Kottayam dist., Kerala, 31. 10. 2000, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2816; 6 ex., Engapuzha, Kozhikode dist., Kerala, 24. 04. 2002, Coll. K.G. Emiliyamma, ZSI/WGRC/IR/INV/2824 and 22 ex., Hipla/Hebbae, Muthodi Range, Bhadra W.L.S., Chikkamagaluru dist., Karnataka, 12. 11. 2006, Coll. K.G. Emiliyamma, ZSI/WGRC/IR/INV/2827.

*Distribution:* India: Common throughout the country including Karnataka and Kerala. *Elsewhere* : Bangladesh, China, Indonesia, Iran, Malaysia, Myanmar, Nepal, Oman, Pakistan, Saudi Arabia, Sri Lanka, Thailand, Vietnam and Yemen.

**28. *Lamellidens consobrinus*** (Lea, 1859)

(Plate-IV, Figs. 12, 13)

1859. *Unio consobrinus* Lea, *Proc. Acad. Nat. Sci. Philadelphia*, **11**: 331.

2007. *Lamellidens consobrinus* Ramakrishna and Dey, *Handbook on Indian Freshwater Molluscs*: 281.

*Material examined:* 4 ex., Valayar, Palakkad

dist., Kerala, 18. 03. 1999, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2863.

*Distribution:* India: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Jharkhand, Kerala, Maharashtra, Puducherry, Tamil Nadu, Uttar Pradesh and West Bengal. *Elsewhere:* Bangladesh, China? Nepal and Sri Lanka.

*Remarks:* New record to Kerala.

**29. *Lamellidens marginalis*** (Lamarck, 1819)

(Plate-IV, Figs. 14, 15)

1819. *Unio marginalis* Lamarck, *Hist. Nat. Anim. Sans Vert.*, **6**(1): 79.

2007. *Lamellidens marginalis* Ramakrishna and Dey, *Handbook on Indian Freshwater Molluscs*: 288.

*Material examined:* 2 ex., Kakkathavil River, Kodagu dist., Karnataka, 02. 01. 1985, Coll. K.N. Nair & Party, ZSI/WGRC/IR/INV/2848; 1 ex., Nedupuzha, Trichur, Thrissur dist., Kerala, 20. 02. 1985, Coll. K.N. Nair, ZSI/WGRC/IR/INV/2775; 1 ex., Nedupuzha, Thrissur dist., Kerala, 20. 02. 1985, Coll. K.N. Nair, ZSI/WGRC/IR/INV/2866; 1 ex., Killiyar, Panood Bridge, Thiruvananthapuram dist., Kerala, 18. 02. 1987, Coll. K.N. Nair & Party, ZSI/WGRC/IR/INV/2849; 1 ex., Benne Block, Jodipalam Hill Stream, Mudumalai W.L.S., Nilgiri Biosphere, Nilgiri dist., Tamil Nadu, 30. 12. 1987, Coll. K.N. Nair & Party, ZSI/WGRC/IR/INV/2878; 1 ex., Parambikulam Tunnel, Parambikulam W.L.S., Palakkad dist., Kerala, 21. 03. 1996, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2858; 1 ex., Chulliyar, Palakkad dist., Kerala, 23. 03. 1999, Coll. P.M. Sureshan, ZSI/WGRC/IR/INV/2784 and 3 ex., Kidangoor/Periyar, Kottayam dist., Kerala, 30. 10. 2000, Coll. P.M. Sureshan & Party, ZSI/WGRC/IR/INV/2850.

*Distribution:* India: Common throughout the country including Karnataka, Kerala and Tamil Nadu. *Elsewhere* : Bangladesh, Myanmar, Nepal and Sri Lanka.

**30. *Parreysia (Parreysia) corrugata***

(Müller, 1774)

(Plate-IV, Figs. 16, 17)

1774. *Mya corrugata* Müller, *Verm. Terr. et Fluv.*, **2** : 214.



Table 1. contd.

| Species                                | Karnataka      |        |       | Kerala    |           |        |        |           |          |           |            |          |                |                    |          |         | Maharashtra |        |        | Tamil Nadu |             |         | Specimens studied |
|--|----------------|--------|-------|-----------|-----------|--------|--------|-----------|----------|-----------|------------|----------|----------------|--------------------|----------|---------|-------------|--------|--------|------------|-------------|---------|-------------------|
|  | Chikkamagaluru | Kodagu | Udupi | Alappuzha | Ernakulam | Idukki | Kannur | Kasaragod | Kottayam | Kozhikode | Malappuram | Palakkad | Pathanamthitta | Thiruvananthapuram | Thrissur | Wayanad | Pune        | Raigad | Satara | Coimbatore | Kanyakumari | Nilgiri |                   |
| <i>Paludomus (Tanalia) neritoides</i>  | -              | -      | -     | -         | -         | -      | -      | -         | -        | -         | -          | +        | -              | -                  | +        | -       | -           | -      | -      | +          | -           | -       | 22                |
| <i>Melanooides tuberculata</i>         | -              | -      | -     | -         | -         | -      | -      | -         | -        | -         | +          | +        | -              | -                  | -        | -       | -           | -      | -      | -          | -           | -       | 22                |
| <i>Tarebia granifera</i>               | -              | +      | -     | -         | -         | -      | -      | -         | -        | -         | -          | -        | -              | -                  | -        | +       | -           | -      | -      | -          | -           | -       | 8                 |
| <i>Thiara (Thiara) scabra</i>          | -              | +      | -     | -         | -         | -      | -      | -         | -        | -         | +          | +        | -              | -                  | -        | -       | -           | -      | -      | -          | -           | -       | 17                |
| <i>Cremnoconchus agumbensis</i>        | -              | -      | +     | -         | -         | -      | -      | -         | -        | -         | -          | -        | -              | -                  | -        | -       | -           | -      | -      | -          | -           | -       | 3                 |
| <i>Cremnoconchus canaliculatus</i>     | -              | -      | -     | -         | -         | -      | -      | -         | -        | -         | -          | -        | -              | -                  | -        | +       | +           | +      | -      | -          | -           | -       | 4                 |
| <i>Cremnoconchus castanea</i>          | -              | -      | +     | -         | -         | -      | -      | -         | -        | -         | -          | -        | -              | -                  | -        | -       | -           | -      | -      | -          | -           | -       | 3                 |
| <i>Cremnoconchus cingulatus</i>        | -              | -      | +     | -         | -         | -      | -      | -         | -        | -         | -          | -        | -              | -                  | -        | -       | -           | -      | -      | -          | -           | -       | 4                 |
| <i>Cremnoconchus conicus</i>           | -              | -      | -     | -         | -         | -      | -      | -         | -        | -         | -          | -        | -              | -                  | -        | +       | -           | +      | -      | -          | -           | -       | 4                 |
| <i>Cremnoconchus dwarakii</i>          | -              | -      | +     | -         | -         | -      | -      | -         | -        | -         | -          | -        | -              | -                  | -        | -       | -           | -      | -      | -          | -           | -       | 5                 |
| <i>Cremnoconchus globulus</i>          | +              | -      | -     | -         | -         | -      | -      | -         | -        | -         | -          | -        | -              | -                  | -        | -       | -           | -      | -      | -          | -           | -       | 5                 |
| <i>Cremnoconchus hanumani</i>          | +              | -      | -     | -         | -         | -      | -      | -         | -        | -         | -          | -        | -              | -                  | -        | -       | -           | -      | -      | -          | -           | -       | 5                 |
| <i>Cremnoconchus syhadrensis</i>       | -              | -      | -     | -         | -         | -      | -      | -         | -        | -         | -          | -        | -              | -                  | -        | +       | +           | -      | -      | -          | -           | -       | 5                 |
| <i>Radix luteola</i>                   | +              | +      | -     | -         | -         | -      | -      | -         | -        | -         | -          | -        | -              | -                  | -        | -       | -           | -      | -      | -          | -           | -       | 5                 |
| <i>Indoplanorbis exustus</i>           | +              | +      | -     | -         | -         | -      | +      | -         | +        | +         | -          | -        | -              | -                  | -        | +       | -           | -      | -      | -          | -           | -       | 161               |
| <i>Lamellidens consobrinus</i>         | -              | -      | -     | -         | -         | -      | -      | -         | -        | -         | -          | +        | -              | -                  | -        | -       | -           | -      | -      | -          | -           | -       | 4                 |
| <i>Lamellidens marginalis</i>          | -              | +      | -     | -         | -         | -      | -      | -         | +        | -         | -          | +        | -              | +                  | +        | -       | -           | -      | -      | -          | -           | +       | 11                |
| <i>Parreysia (Parreysia) corrugata</i> | -              | +      | -     | -         | -         | -      | -      | -         | +        | -         | -          | +        | -              | -                  | +        | +       | -           | -      | -      | -          | +           | -       | 18                |
| Specimens studied                      | 38             | 175    | 14    | 10        | 26        | 125    | 130    | 45        | 83       | 161       | 19         | 88       | 15             | 1                  | 78       | 20      | 7           | 4      | 2      | 2          | 4           | 1       | 1049*             |

\* 1 specimen from Karnataka with unknown locality

Among the freshwater gastropods, *Paludomus (Tanalia) neritoides* Reeve, 1847 is a new record to Tamil Nadu whereas *Tarebia granifera* (Lamarck, 1822) is reported for the first time from Karnataka and Kerala. The bivalve, *Lamellidens consobrinus* (Lea, 1859) stood as a new record to Kerala.

### SUMMARY

This paper is a first list of land and freshwater molluscs (6 land forms and 24 freshwater species) in the holdings of Western Ghat Regional Centre, Zoological Survey of India, Kozhikode. Both type (20 specimens) and non-type (1029 specimens) materials are included in the present

study, collected mainly from Western Ghats of Karnataka, Kerala, Maharashtra and Tamil Nadu over a period of 33 years from 1981 to 2013. A total of 30 species under 18 genera, 12 subfamilies of 13 families, 11 superfamilies, 4 orders and an unassigned order, 3 subclasses and 2 classes were identified. Systematic list and account of all the identified species are provided along with data on their distribution patterns. Some new records were also encountered during the present study: *Paludomus (Tanalia) neritoides* Reeve, 1847 new record to Tamil Nadu; *Tarebia granifera* (Lamarck, 1822) first report to Karnataka and Kerala, and *Lamellidens consobrinus* (Lea, 1859) new report to Kerala.



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PLATE-I



Plate-I. Land molluscs : 1-3. *Cyclophorus (Litostylus) nilagiricus*; 4, 5. *Achatina (Lissachatina) fulica*; 6-8. *Corillaanax*; 9-11. *Euplecta subcastor*; 12-14. *Hemiplecta basileus*; 15, 16. *Indrella ampulla*. 1, 6, 9, 12, apical views; 2, 7, 10, 13, basal views; 3, 5, 8, 11, 14, 16, apertural views; 4, 15, abapertural views. Scale bar = 10 mm.

## PLATE-II

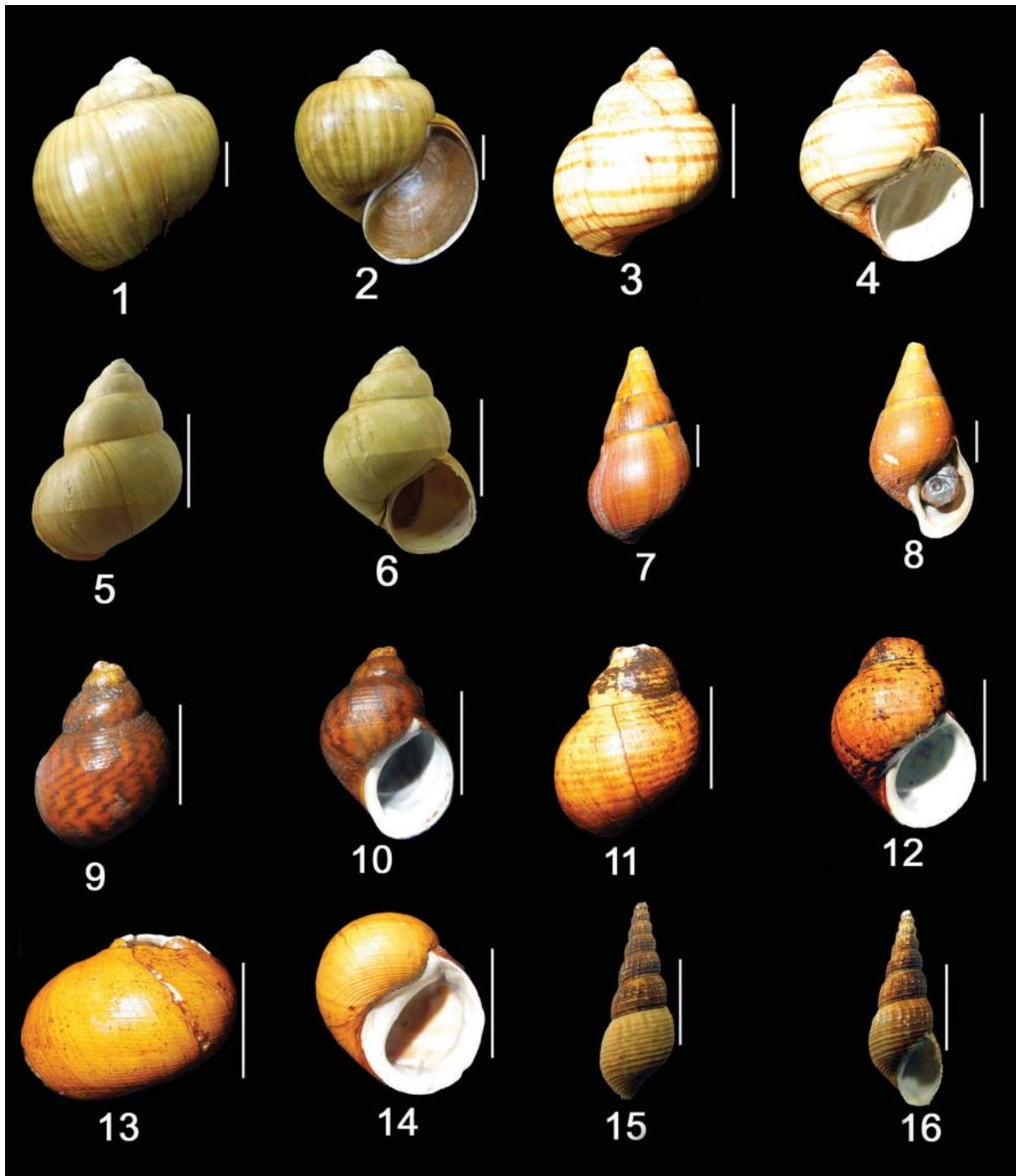


Plate-II. Freshwater molluscs : 1, 2. *Pila virens*; 3, 4. *Bellamya bengalensis*; 5, 6. *Bellamya dissimilis*; 7, 8. *Paracrostoma huegelii*; 9, 10. *Paludomus (Paludomus) annandalei*; 11, 12. *Paludomus (Philopotamis) sulcatus*; 13, 14. *Paludomus (Tanalia) neritoides*; 15, 16. *Melanoides tuberculata*, 1, 3, 5, 7, 9, 11, 13, 15, abapertural views; 2, 4, 6, 8, 10, 12, 14, 16, apertural views. Scale bar = 10 mm.

PLATE-III

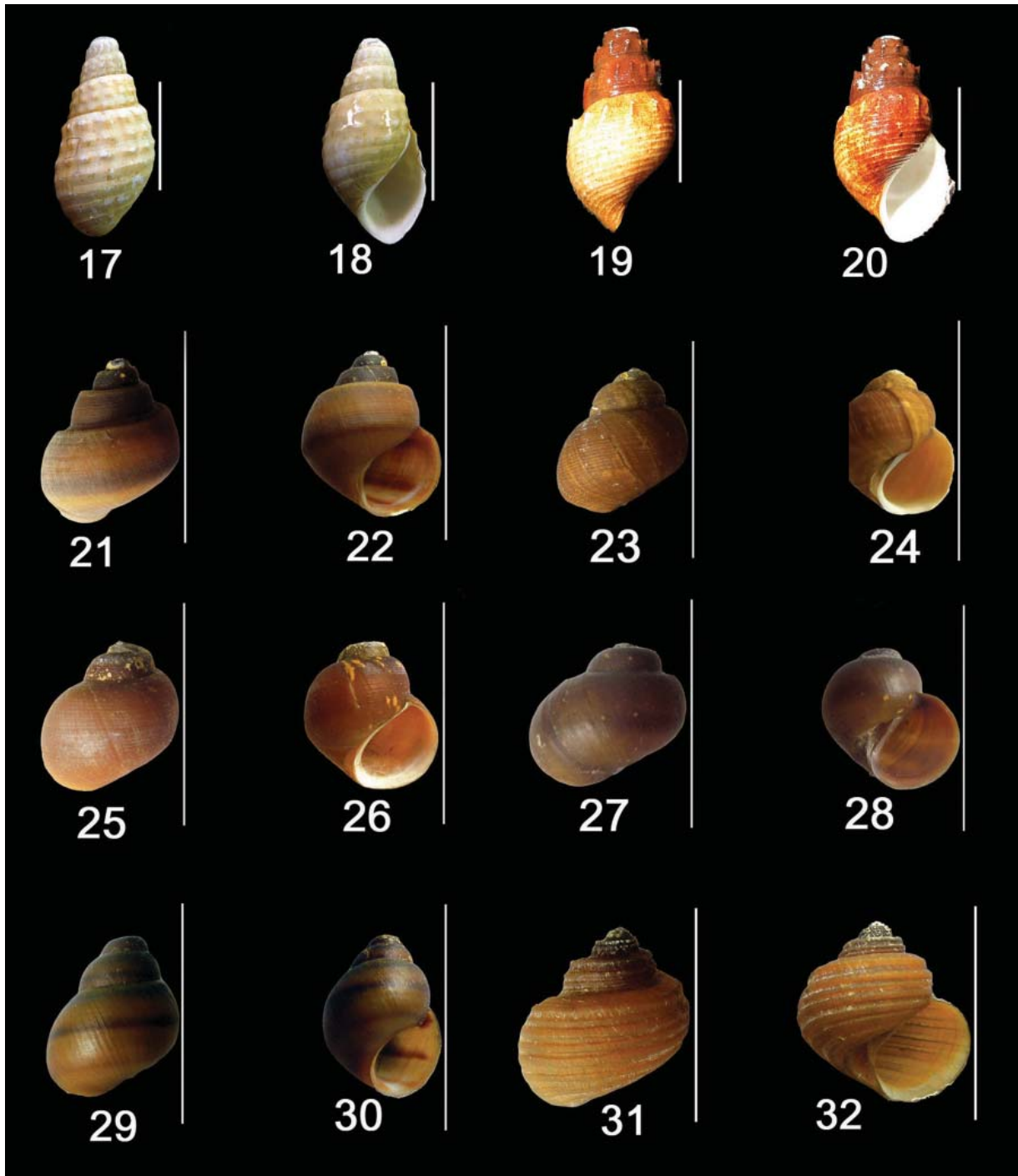


Plate-III. Freshwater molluscs : 17, 18. *Tarebia granifera*; 19, 20. *Thiara (Thiara) scabra*; 21, 22. *Cremnoconchus agumbensis* (holotype); 23, 24. *Cremnoconchus canaliculatus*; 25, 26. *Cremnoconchus castanea* (holotype); 27, 28. *Cremnoconchus cingulatus* (holotype); 29, 30. *Cremnoconchus conicus*; 31, 32. *Cremnoconchus dwarakii* (holotype). 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, abapertural views; 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, apertural views. Scale bar = 10 mm.



## PLATE-IV

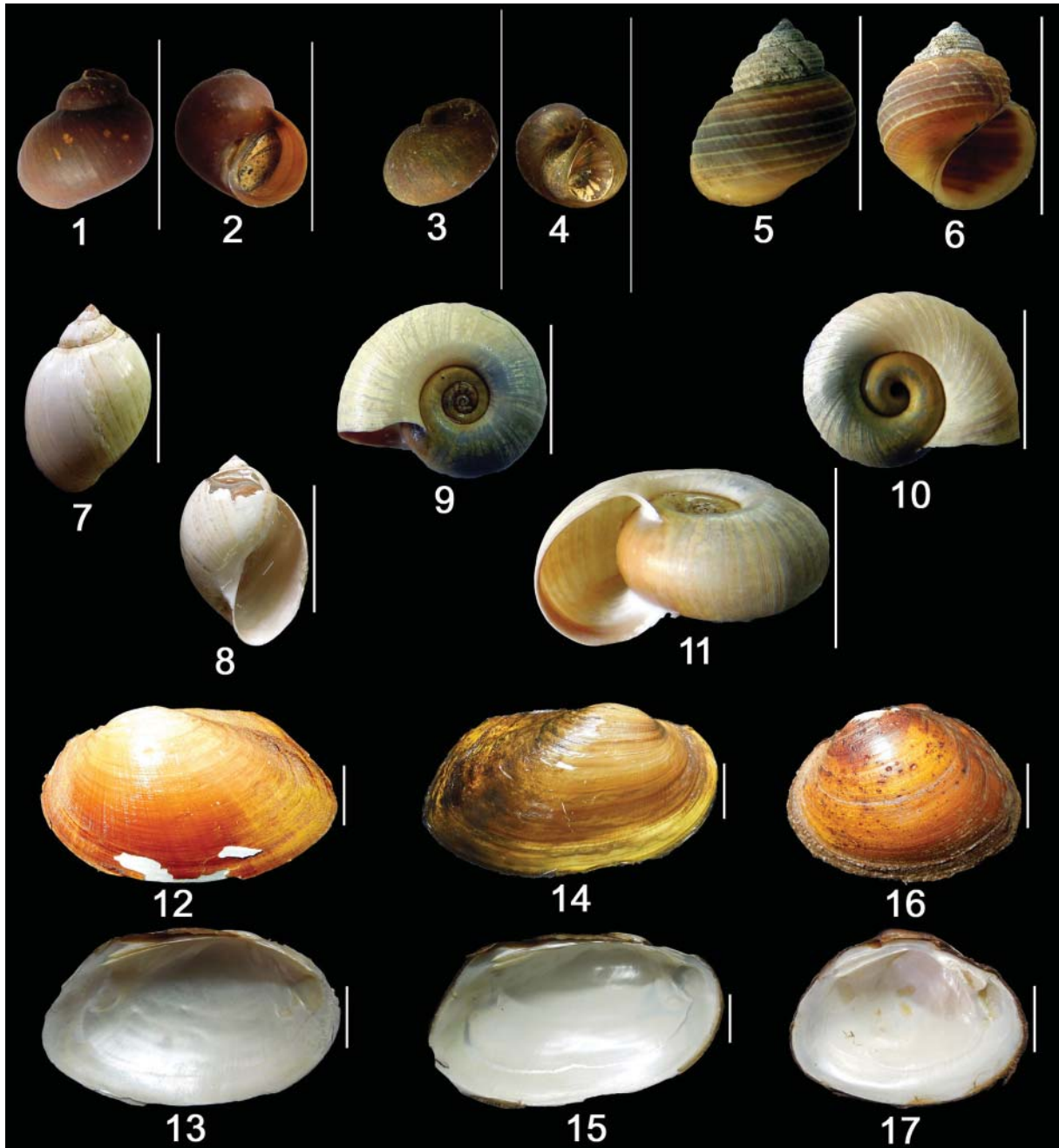


Plate-IV. Freshwater molluscs : 1, 2. *Cremnoconchus globulus* (holotype); 3, 4. *Cremnoconchus hanumani* (holotype); 5, 6. *Cremnoconchus syhadrensis*; 7, 8. *Radix luteola*; 9–11. *Indoplanorbis exustus*; 12, 13. *Lamellidens consobrinus*; 14, 15. *Lamellidens marginalis*; 16, 17. *Parreysia* (*Parreysia*) *corrugata*. 1, 3, 5, 7, abapertural views; 2, 4, 6, 8, 11, apertural views; 9, apical view; 10, basal view; 12, 16, exterior views of left valve; 14, exterior view of right valve; 13, 15, 17, interior views of left valve. Scale bar = 10 mm.