

**KEYHOLE LIMPETS and ABALONES****List of species**

Family: 1. Fissurellidae J. Flemming, 1822      **Keyhole limpets**

1. *Clypidina notata* (Linnaeus, 1758)
2. *Diodora mus* (Reeve, 1850)
3. *Diodora ruppellii* (G. B. Sowerby I, 1835)
4. *Diodora* sp. 1
5. *Emarginula fissurata* Holten, 1802
6. *Scutus unguis* (Linnaeus, 1758)

**Other species reported from Sri Lanka**

*Macroschisma* sp.  
- Kirtisinghe, 1978

Family: 2. Haliotidae Rafinesque, 1815      **Abalones**

1. *Haliotis varia* Linnaeus, 1758

**Other species reported from Sri Lanka**

*Haliotis gigantea* Gmelin, 1791  
*Haliotis planata* G. B. Sowerby II, 1882  
- Kirtisinghe, 1978  
*Haliotis rugosa pustulata* Reeve, 1846  
- Perera and Weerakkody (2004)

**FISSURELLIDAE Fleming, 1822**

Keyhole limpets

A large family with a number of subfamilies and many genera. The shells of most species are cap-shaped and limpet-like with radial ribs, but others have depressed, shield-like shells. A characteristic of this family is that there is an anal opening in the shell – a feature lacking in the true limpets and the false limpets. In the typical case the opening is at the apex and this may be circular, oval, elongated or keyhole-shaped, giving rise to the popular family name. In some species the apical opening is replaced by an anterior marginal slit or is absent altogether. In species with shield-shaped shells, there is a shallow posterior marginal indentation. An operculum is absent.

Intertidal and shallow rocky habitats, where they are found attached to rocks. Generally described as herbivorous, feeding on algae. However, three species of *Diodora* described in Siddiqui et al, 2007, as well as *Scutus*, are said to feed on sponges that grow on the underside of rocks.

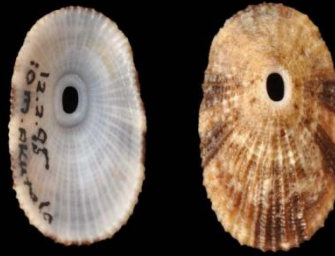
(de Bruyne, 2003; Siddiqui et al, 2007)



Fissurellidae



*Clypidina notata*  
Up to 27mm



*Diodora mus*  
Actual size 19mm



*Diodora ruppelli*  
Actual size 26mm



*Diodora* sp. 1  
Actual size 20.3mm



*Emarginula fissurata*  
Up to 13.4mm



*Scutus unguis*  
Actual size 36mm

Haliotidae



*Haliotis varia*  
Actual size 40mm

1. *Clypidina notata* (Linnaeus, 1758) Remarkable limpet  
Subfamily Emarginulinae

Shell conical, aperture oval, apex anterior, the margin wavy corresponding to the numerous rough radial riblets, all of the same size. The apex pointed at first, gradually eroding with age. No apical perforation or marginal slit but a shallow groove from the apex to the anterior margin on the inner aspect identifies this as a fissurellid and not a patellid. The ground colour blue-grey with black riblets, apex white with two black dots to either side at first, becoming obscured as it erodes, interior white with marginal black patches and lines, the body scar blue-black. Often encrusted with lime salts.

27.2 x 21.75 x 9.74 mm (l x w x ht) - largest collected.

Mount Lavinia; Maggona, Thudawa Bay; Dondra, base of lighthouse; Trincomalee, Nilaveli, Pigeon Islands. All epilithic on intertidal rocky shore, above algae fringe. Gregarious, often in association with *Cellana rota* and *Patelloida striata*.

2. *Diodora mus* (Reeve, 1850) Mouse keyhole limpet  
Subfamily Diodorinae

Shell low conical, narrowly elliptical in outline, the two long sides nearly straight and parallel, the ends evenly rounded, the aperture margin crenulate corresponding to the radial ribs. Apex about 1/3 distance from anterior end, perforated by a symmetrical, elongated-oval opening directed upwards, its margins smooth. Seen in profile, the perforation sits atop a chimney-like elevation on the apex. Sculpture cancellate: up to 50 slender radial ribs crossed by thinner concentric threads. Interior glossy, furrowed to some extent by the continuation of the crenulations. The apical perforation rimmed by callus. Greyish, with irregular radiating brown rays and wedges. Interior white, the external colour showing through. Reported size range 1.5 - 2.6 cm.

18.92 x 10.2 mm; .20.58 x 12.55 mm (l x w).

Mount Lavinia, beached; Akurala, shipwreck *Earl of Shaftesbury*, 10 m, live on iron hull plates.

3. *Diodora ruppellii* (G. B. Sowerby I, 1835) Ruppell's keyhole limpet  
Subfamily Diodorinae

Shell high conical, broadly oval in outline with both sides, anterior and posterior margins convex, the anterior markedly narrower. Apex anterior, the perforation oval or somewhat key hole-shaped placed in front of it, facing forwards. Margin regular, interior crenulate. Sculpture consists of about 150 radial ribs differing in thickness, mostly thick ribs alternating with narrow ones, crossed by fine concentric threads, the intersections granular. Interior smooth, white, or greyish with the external colour showing through, the perforation margin rimmed by callus. Divergent broad dark brown rays are separated by narrow cream coloured rays.

25.65 x 20.63 x 9.73 mm.

Maggona, Thudawa Bay, fishing trash, empty. Slightly damaged anterior margin.

4. *Diodora* sp. 1 Rayed keyhole limpet  
Subfamily Diodorinae

Shell low conical, broadly elliptical in outline, the two long sides nearly straight and converging anteriorly, the ends broadly rounded, the aperture margin crenulate, somewhat down-turned, especially behind. Apex about 1/3 distance from anterior end, perforation keyhole-shaped, placed in front of the apex and facing forwards, its margins smooth. Sculpture consists of up to 60 radial ribs differing greatly in thickness crossed by fine concentric threads, the intersections granular. Interior smooth, the perforation rimmed by callus. Tan, with eight radiating brown wedges that do not intrude onto the apex, the perforation margin brown. Interior greyish, the external pattern showing through. The perforation callus outlined by a black horseshoe, open in front. A short distance away from the apex is a broken line of eight black bars, each corresponding to an external radial ray.

20.34 x 13.65 mm.

No collection data recorded. This find was at first referred to *D. mus* until separated on 7.2.2009. No matching images have been found at the time of writing (24.5.2019) and it remains un-determined.

5. *Emarginula fissurata* Holten, 1802 Slit emarginula  
Subfamily Emarginulinae

Shells thick, limpet-like with oval outline, narrower anteriorly than behind. Apex points backwards, the posterior and side profiles straight, anterior profile convex. No opening in shell - a groove on the inside leads from the apex to a short slit in the anterior margin. Numerous rough radial ribs coloured cinnamon with variable white rays numbering 4 to 6, sometimes complete, more often visible as interrupted rays or short lines at the periphery. Interior porcellaneous, blue-grey in colour.

Trincomalee, Kinniya, Turtle Lodge island, 1 m, under small rocks. 10 shells.

13.43 to 9.48 mm in length.

Tucker Abbott and Peter Dance, 1982 give the size range as 0.95 - 1.4 cm.

**Note:** These shells were collected in 1982 and identified many years later with reference to an image in Abbott & Dance, 1982 (page 24). They are listed in Hardy's Guide with no image, the literature quoted being Abbott & Dance, 1982.

*E. fissurata* Holten is not listed in MolluscaBase/WoRMS (23.5.2019, 19.6.2020.). The similar sounding *E. fissura* L. is a conical, temperate, deep-water species. The Natural History Museum, Rotterdam picture pages carries an image of *Emarginula fissurata* A. Adams, 1851 from Australia. The image does not match the Sri Lanka shells exactly, but is close.

This species from Sri Lanka is interesting, as no species of *Emarginula* are reported in the Book of Indian Shells (Apte, 1998) or in the molluscs volume of the Bangladesh Encyclopedia (Siddiqui et al, 2007). The Catalogue of Marine Molluscs of Andaman and Nicobar Islands (Subba Rao and Dey, 2000) however, list four species (*clypea* A. Adams 1851, *eximia* A. Adams 1851, *fuliginea* A. Adams 1851 and *scabriuscula* A. Adams 1851). All four species are listed in MolluscaBase (May, 2019) with the following revisions: '*clypea*' to '*clypeus*' and *Emarginula eximia* accepted as *Emarginella eximia* (A. Adams, 1852).

The genus *Emarginula* contains shells with marginal slits (Dance, 1977).

## 6. *Scutus unguis* (Linnaeus, 1758) Hoof shield-limpet Subfamily Emarginulinae

The shell is much longer than wide, elliptical with straight sides, a broadly rounded posterior and a narrowed anterior with a shallow notch; shallowly convex. The upper surface is rough with numerous fine growth lines, the under surface polished, off-white in colour. The animal is larger than the shell and in life the mottled brown mantle covers it entirely. Grazes on algae and sponges.

36.07 x 19 mm.

Mount Lavinia, Hotel Bay, empty; Mount Lavinia, Bellangala rocky islet, 5 m, underneath small rock, live collected; Trincomalee, 3 m. All by diving.



## HALIOTIDAE Rafinesque, 1815

### Abalones

Robust, ear-shaped shells with 2 to 3 whorls. Spire eccentric, protruding only a little or not at all, the aperture occupying most of the underside. A spiral row of holes on the left side of the body whorl, sometimes on tubular projections, only the most recent remaining open. Inner lip thickened and shelf-like. Spiral ornamentation. The interior nacreous, ranging from silvery-white to greenish-red.

Approximately 100 species worldwide in one genus, distributed from intertidal zones down to about 50 m. Foot broad and very strong, by which they attach firmly to rocks, moving about by night rasping the algae on which they feed. Tropical species are small compared to those of temperate seas. Abalones are commercially important as food, the muscular foot being a delicacy. The shells are used for making ornaments on account of the mother-of-pearl interior.

(Poutiers, 1998; de Bruyne, 2003)

### 1. *Haliotis varia* Linnaeus, 1758 Varied or Variable Abalone

[*Sanhaliotis aliena* Iredale, 1929; In Kirtisinghe, 1978 as *Sanhaliotis varia*]

The genus *Sanhaliotis* Iredale, 1929, as well as a number of other genera, have been accepted as *Haliotis* Linnaeus, 1758

(MolluscaBase/WoRMS, 24.5.2019)

Shell flat, ear-shaped, loosely coiled with a low spire, flattened apex and a broad aperture that occupies most of the underside. Outer lip thin and sharp, inner lip thickened to form a flat shelf. Ornamentation consists of thick and thin scaly, spiral cords crossed by a few irregularly arranged low axial ribs giving an uneven surface. Along the periphery is a series of protuberant holes, the last 4 or 5 open, the earlier ones closed. Colour chocolate brown tinged with red overlaid with off-white spiral and axial bands and patches. Interior nacreous, iridescent silver with spiral grooves reflecting the external ornamentation.

40.3 x 28, 38 x 25, 16 x 11 mm.

Colombo, Kinross First reef crest, 2 m, live collected at night; Trincomalee, 3 m, site not recorded (1981).

## Bibliography

- Apte, Deepak (1998) *The Book of Indian Shells*, Bombay Natural History Society/Oxford University Press, Mumbai.
- Abbott, R. Tucker (1994) *Seashells of Southeast Asia*, Graham Brash, Singapore.de Bruyne, 2003.
- Abbott, R. Tucker & S. Peter Dance (1982) *Compendium of Seashells*, E. P. Dutton, New York.
- Cunha T.J., Lemer S., Bouchet P., Kano Y. & Giribet G. (2019). Putting keyhole limpets on the map: phylogeny and biogeography of the globally distributed marine family Fissurellidae (Vetigastropoda, Mollusca). *Molecular Phylogenetics and Evolution*. 135: 249-269., available online at <https://doi.org/10.1016/j.ympev.2019.02.008>
- De Bruyne, R. H. (2003) *The Complete Encyclopedia of Shells*, Rebo Productions, Lisse, The Netherlands.
- Eisenberg, Jerome M. (1989) *A collector's guide to seashells of the world*, Crescent Books, New York.
- Hardy's Internet Guide to Marine Gastropods (& Near Classes) <http://www.gastropods.com/>
- Kirtisinghe, Parakrama (1978) *Sea shells of Sri Lanka*, Tuttle, Tokyo.
- Oliver, A. P. H. (1989) *The Hamlyn guide to shells of the world*, Hamlyn, London.
- Perera E.N.R. and Weerakkody P. 2004. *A Biodiversity Status profile of Sub-tidal and inter-tidal Habitats of the Rekawa, Ussangoda and Kalametiya Area*, occ. pap. IUCN, Sri Lanka, 5: iii+33pp.
- Poutiers, J. M. (1998) *Gastropods* In: Carpenter, K. E. and Niem, V. H. (eds.), In: *FAO Species Identification Guide for Fishery Purposes, The Living Marine Resources of the Western Central Pacific*. Vol. 1. pp. 364-686, FAO, Rome.
- Siddiqui, K.U., Islam, M.A., Kabir, S.M.H., Ahmad, M., Ahmed, A.T.A., Rahman, A.K.A., Haque, E.U., Ahmed, Z.U., Begum, Z.N.T., Hassan, M.A., Khondker, M. and Rahman, M.M. (eds.) (2007) *Encyclopedia of Flora and Fauna of Bangladesh*, Vol. 17, Molluscs, 415 pp. Asiatic Society of Bangladesh, Dhaka.
- Subba Rao, NV & Dey, A (2000) Catalogue of Marine Molluscs of Andaman and Nicobar Islands, *Rec. zool. Surv. India, Occ. Paper No. 187*, i-x, 1-323 pp., Director, ZSI, Calcutta.

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