

***PILA CONICA* (WOOD, 1828), OR *PILA SCUTATA* (MOUSSON, 1848)?
THE CORRECT NAME FOR THE NATIVE APPLE SNAIL OF SINGAPORE
(GASTROPODA: AMPULLARIIDAE)**

Martyn E. Y. Low^{1*}, S. K. Tan¹ and T. H. Ng²

¹Raffles Museum of Biodiversity Research, National University of Singapore
Block S6, Science Drive 2, Singapore 117546, Republic of Singapore

²Department of Biological Sciences, National University of Singapore
14 Science Drive 4, Singapore 117543, Republic of Singapore

(*Corresponding author: m.low@me.com)

ABSTRACT. — A native ampullariid found in Singapore has been recorded as both *Pila conica* (Wood, 1828) and *Pila scutata* (Mousson, 1848). Both names are generally accepted to be synonyms, but the nomenclature remains confused, with authors generally preferring one over the other. To clarify the confusion, the history of the names is presented to show that *Pila conica* is a rejected junior homonym and that *Pila scutata* is the proper name to apply to this taxon. The earliest records of this apple snail in Singapore are also mentioned as a note of interest and the importance of clarifying the nomenclatural confusion is discussed.

KEY WORDS. — Mollusca, nomenclature, homonym, synonym, earliest record, trematode parasites, host

INTRODUCTION

Several species of ampullariids have been recorded from Singapore, including *Pila ampullacea* (Linnaeus, 1758), *Pila conica* (Wood, 1828), *Pila scutata* (Mousson, 1848), *Pomacea canaliculata* (Lamarck, 1822), *Pomacea insularum* (d'Orbigny, 1835), and *Pomacea lineata* (Spix, in Wagner, 1827) (Maassen, 2001: 47; Hayes et al., 2008: 706; Tan & Woo, 2010: 27; Tan et al., 2012: 126, 127). The actual local species diversity of ampullariids is however probably lower—this discrepancy may be attributed to the confused state of their taxonomy and nomenclature. A recent study by Hayes et al. (2012) has clarified the taxonomy and nomenclature of a few *Pomacea* species, but nomenclatural confusion persists over the local *Pila* species.

The uncertainty surrounding the valid (or accepted) name for the native apple snail in Singapore is owed largely to the confused nomenclature of this taxon. In particular, two are in current use for this species: *Pila conica* (Wood, 1828) (e.g., Bonne et al., 1953: 13, 15; Perera & Walls, 1996: 82, unnumbered fig.; Cowie, 1997: 3, 4; Smith, 2003: 245, 252; Jørgensen et al., 2008: 247; Darrigran & Damborenea, 2009: 19; Hayes et al., 2009a: 51; Hayes et al., 2009b: 65; Joordens et al., 2009: 663, 664; Horgan et al., 2012: 2–5, 7), and *Pila scutata* (Mousson, 1848) (e.g., Benthem Jutting, 1956: 332–336; Purnami et al., 2010: 54; Tan & Woo, 2010: 27; Agrawal, 2012: 58; Tan et al., 2012: 126, 127).

The earliest records of this apple snail in Singapore are also mentioned as a note of interest and the importance of clarifying the nomenclatural confusion is discussed.

***PILA CONICA* (WOOD, 1828) OR *PILA SCUTATA* (MOUSSON, 1848)?**

In 1828, the specific epithet *conica* was proposed by Wood (1828: 22, 29, pl. 7, Fig. 22) for a shell of unknown origin (reproduced as Fig. 1A). The name *conica* was used in conjunction with two genera—*Ampullaria* (on p. 29) and *Helix* (on p. 22). Cowie (1997: 3, 4) accepted the name *Ampullaria conica* and is deemed to have first selected the genus in which *conica* was first described by Wood (1828) under the rules of nomenclature (Article 24.2, ICZN, 1999: 30).

Unfortunately, the name *Ampullaria conica* had already been used twice for different species. *Ampullaria conica* Lamarck, 1804, is now *Ampullina conica* (Lamarck, 1804), a valid fossil species (see Brigantini, 1985: 410). *Ampullaria conica* Swainson, 1823, is considered to be identical to *Pila virens* (Lamarck, 1822) (see Cowie & Thiengo, 2003: 52).

The junior homonym (i.e., *Ampullaria conica* Wood, 1828) was permanently rejected by Benthem Jutting (1956: 332) who realised that it was preoccupied by its earlier use by Lamarck (1804: 31). This permanent rejection of

Ampullaria conica as used by Wood (1828: 22, 29) means that the binomial name *Ampullaria conica* Wood, 1828 is no longer available for use (Article 57.2, ICZN, 1999: 59; also see the remarks by Cowie, in Coan & Petit, 2011: 31).

Even if Cowie (1997: 3, 4) had selected *Helix* over *Ampullaria* as the correct genus in which *conica* (Wood, 1828) was described, the name would still be preoccupied—Schlotheim (1818: 340) and Draparnaud (1801: 69) had earlier used the name *Helix conica*. The use of the name *Helix conica* by Renier (1804: xi) is not an available one (ICZN, 1954: 1956).

The authorship of the name *Ampullaria conica* (as used in Wood, 1828: 22, 29) has been attributed to “Gray” (e.g., Sowerby III, 1910: 57; Preston, 1915: 100; Benthem Jutting, 1937: 105; Cowie, 1995: 63) or “Gray in Wood” (e.g., Nevill, 1885: 5). As discussed in Petit (2012: 18), the names in the “Supplement to Index Testaceologicus” (i.e., Wood, 1828) cannot be attributed to Gray, and must be attributed to Wood alone (see also Coan & Petit, 2011: 31). The putative holotype of *Pila conica* (Wood, 1828) is in the Natural History Museum (London) (see Prashad, 1925: 79).

Being a preoccupied (and unavailable) name, the species denoted by *Ampullaria conica* Wood, 1828, needs to be substituted with the next available name or given a new name (Article 60, ICZN, 1999: 62). *Ampullaria scutata* Mousson, 1848, has been widely accepted as junior synonym of *Ampullaria conica* Wood, 1828 (see Hanley, 1854: unnumbered caption to *Ampullaria* pl.; Benthem Jutting, 1956: 332, 333; Brandt, 1974: 52, 53; Maassen, 2001: 46, 47; Tan & Woo, 2010: 27; Tan et al., 2012: 127). Hanley (1854: unnumbered caption to *Ampullaria* pl.) was the first author to consider *Ampullaria conica* Wood, 1828, and *Ampullaria scutata* Mousson, 1848, to be conspecific when he wrote: “*A. conica* of Gray (in Wood’s Suppl. Ind. Test.) ... [s]eems *scutata* of Mousson”.

A year before his 1849 book “Die Land- und Süßwasser-Mollusken von Java” appeared, Mousson (1848) published a short summary of the contents of his forthcoming book. This summary by Mousson (1848) included many new names, including “*Ampullaria scutata*”, which was used on p. 268, together with the brief diagnosis “änliche Form wie die vorige, stets viel kleiner, unregelmässiger” [= like the previous form, always a lot smaller, irregular]. This makes the name *Ampullaria scutata* available from Mousson, 1848. The “previous form” referred to by Mousson (1848: 268) is *Ampullaria celebensis* (Quoy & Gaimard, 1834), which is considered a synonym of *Ampullaria ampullacea* Linnaeus, 1758 (see Alderson, 1925: 60). *Ampullaria scutata* Mousson, 1848, was described in detail and figured in Mousson (1849: pl. 8, Fig. 2; reproduced as Fig. 1B).

Pila scutata (Mousson, 1848) is also known by several synonyms (different names applied by different authors), including *Ampullaria borneensis* Philippi, 1852, *Ampullaria conica* Reeve, 1856, *Pachylabra javanica* var. *fruhstorferi* Kobelt, 1913, *Ampullaria javanica* Reeve, 1856, *Ampullaria orientalis* Philippi, 1849, *Ampullaria perakensis* de Morgan, 1885, *Pachylabra stoliczkana* Nevill, 1877, and *Ampullaria wellesleyensis* de Morgan, 1885 (Alderson, 1925: 78–80; Benthem Jutting, 1956: 332–336; Brandt, 1974: 52, 53; Maassen, 2001: 46, 47; Prashad, 1925: 79–81). It should be noted that this is not an exhaustive list of all known synonyms (and wrongly applied names).

DISTRIBUTION OF *PILA SCUTATA* AND ITS EARLIEST RECORD FROM SINGAPORE

Pila scutata is known to be found in Indonesia, Peninsular Malaysia, Myanmar, the Philippines (Benthem Jutting, 1956: 332–336; Pagulayan & Remigio, 1992: 1–32; Maassen, 2001: 46, 47), Cambodia (JICA, 2007), Laos (Giboda et al., 1991: 59), Singapore (Tan et al., 2012: 126, 127), Vietnam (Vermeulen & Maassen, 2003: 20; Jørgensen et al., 2008: 247; Campbell, 2012: 303), and doubtfully from China (Prashad, 1925: 80). Although recorded from Thailand (e.g., Brandt, 1974: 52, 53), its presence there seems doubtful as no examples were identified in a survey by Keawjam (1990: 11). This species is also an alien or invasive species on the Pacific islands of Guam (Smith, 2003: 245, 252), Hawai‘i (Cowie, 1997: 3, 4), and Palau (Cowie, 2002: 169).

In his checklist of molluscs from “Singapore and its vicinity”, Traill (1847: 240) recorded an unidentified species of *Ampullaria* which may be the earliest record of *Pila scutata* from Singapore. However, this cannot be determined with certainty as Traill’s coverage was not strictly confined to Singapore, and the whereabouts of the material he collected is unknown. The next author to have recorded *Pila scutata* from Singapore was Nevill (1885: 5, as “*Ampullaria conica* var. *borneensis*”), who received specimens from C. J. Irving (a British Resident-Councillor). The veracity of this record by Nevill (1885: 5) is supported by specimens of *Ampullaria scutata* collected by S. Archer in 1885 from Singapore, which are now deposited in the Academy of Natural Sciences of Drexel University (ANSP, 2012). One of these specimens was figured by Perera & Walls (1996: 82, unnumbered fig.) as *Pila conica* (Wood, 1828).

DISCUSSION

The valid name for the native apple snail of Singapore is not purely an academic question. The species is known to be a host of trematode parasites (Bonne et al., 1953: 13, 15; Agrawal, 2012: 58). The continued confusion in nomenclature

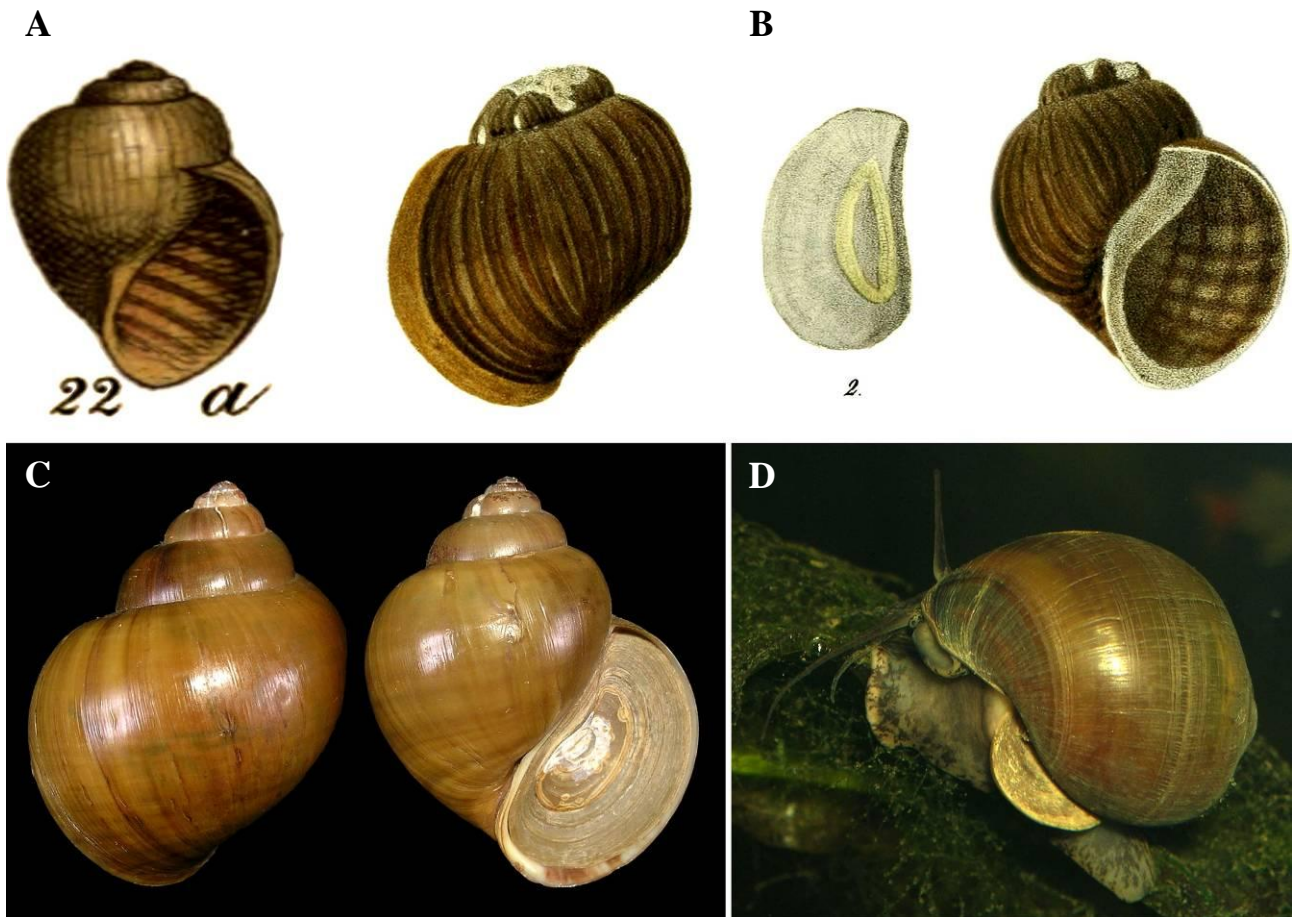


Fig. 1. *Pila scutata* (Mousson, 1848): A, the figure of *Ampullaria conica* taken from Wood, 1828 (pl. 7: Fig. 22); B, the figure of *Ampullaria scutata* taken from Mousson (1849: pl. 8, Fig. 2); C, specimens of *Pila scutata* (Mousson, 1848), from Punggol Port Road, Singapore (SH 40.9 × SW 31.5 mm, SH 41.3 × SW 32.4 mm); D, a live specimen of *Pila scutata* (Mousson, 1848), from Lorong Tawas, Singapore. (Photographs by: Tan Siong Kiat [C, D]).

means that the invalid name [i.e., *Pila conica* (Wood, 1828)] is often used in parasitological publications (Agrawal, 2012: 58). Adding to this confusion, some authors cite both *Pila conica* (Wood, 1828) and *Pila scutata* (Mousson, 1848) as two distinct species (e.g., Chai, 2009: 151, 154, 165). This nomenclatural confusion has consequence for the study of the trematode parasites which *Pila scutata* plays host to.

In the fields of conservation and ecology, the nomenclature of *Pila scutata* is important as it presents an ecological quandary. It appears to be threatened within its native ranges (Guerrero, 2002: 13; Horgan et al., 2012: 4) but is a known invasive species outside of this native range (Cowie, 1997: 3, 4; 2002: 169; Smith, 2003: 245, 252). The application of the correct scientific name for the apple snail known as *Pila scutata* is essential for its conservation inside, and its control outside, of its native range.

ACKNOWLEDGEMENTS

Robert H. Cowie (University of Hawai'i) generously sent us several important references.

LITERATURE CITED

- Agrawal, M. C., 2012. *Schistosomes and Schistosomiasis in South Asia*. Springer, New Delhi. xii + 351 pp.
- Alderson, E. G., 1925. *Studies in Ampullaria*. Heffer & Sons Ltd., Cambridge. xx + 102 pp., 19 pls.
- ANSP (Academy of Natural Science of Drexel University), 2012. *Malacology Collection*. The Academy of Natural Sciences, Philadelphia. <http://clade.ansp.org/malacology/collections/search.php>. (Accessed 9 Mar.2013).
- Bentham Jutting, T. van, 1937. Non marine Mollusca from fossil horizons in Java with special reference to the Trinil Fauna. *Zoologische Mededelingen*, **20**: 83–180.
- Bentham Jutting, T. van, 1956. Systematic studies on the non-marine Mollusca of the Indo-Australian Archipelago. V. Critical revision of the Javanese freshwater gastropods. *Treubia*, **23**: 259–477.

- Bonne, C., G. Bras & K. J. Lie, 1953. Five echinostomes found in man in the Malayan Archipelago. *American Journal of Digestive Diseases*, **20**: 12–16.
- Brandt, R. A. M., 1974. The non-marine aquatic mollusca of Thailand. *Archiv für Molluskenkunde*, **105**: i–iv, 1–423.
- Brigantini, T., 1985. Cypreidi, Naticidi, e Olividi (Gasteropodi) del Cenozoico nell'Italia nordorientale. *Memorie di Scienze Geologiche*, **37**: 407–422.
- Campbell, I. C., 2012. Biodiversity of the Mekong Delta. In: Renaud, F. G. & C. Kuenzer (eds.), *The Mekong Delta System: Interdisciplinary Analyses of a River Delta*. Springer Environmental Science and Engineering, Dordrecht. Pp. 293–313.
- Chai, J. -Y., 2009. Echinostomes in humans. In: Fried, B. & R. Toledo (eds.), *The Biology of Echinostomes*. Springer, New York. Pp. 147–183.
- Coan, E. V., A. R. Kabat & R. E. Petit, 2011. *2,400 Years of Malacology. 9th Edition*. American Malacological Society. 1,024 + 76 [Annex 1 of Collations] + 65 [Annex 2—Küster Collation] pp. http://www.malacological.org/publications/2400_malacology.php (Accessed 9 Mar.2013).
- Coan, E. V. & R. E. Petit, 2011. The publications and malacological taxa of William Wood (1774–1857). *Malacologia*, **54**: 1–76.
- Cowie, R. H., 1995. Identity, distribution and impacts of introduced Ampullariidae and Viviparidae in the Hawaiian Islands. *Journal of Medical and Applied Malacology*, **5**: 61–67.
- Cowie, R. H., 1997. Catalog and bibliography of the nonindigenous nonmarine snails and slugs of the Hawaiian Islands. *Bishop Museum Occasional Papers*, **50**: 1–66.
- Cowie, R. H., 2002. Apple snails (Ampullariidae) as agricultural pests: Their biology, impacts and management. In: Barker, G. M. (ed.), *Molluscs as Crop Pests*. CABI Publishing, Wallingford and New York. Pp. 193–216.
- Cowie, R. H. & S. C. Thiengo, 2003. The apple snails of the Americas (Mollusca: Gastropoda: Ampullariidae: *Asolene*, *Felipponea*, *Marisa*, *Pomacea*, *Pomella*): A nomenclatural type catalog. *Malacologia*, **45**: 41–100.
- d'Orbigny, A. D., 1835. Synopsis terrestrium et fluviatilium molluscorum, in suo per Americam meridionalem itinere. *Magasin de Zoologie*, **5**(61–62): 1–44.
- Darrigran, G. & C. Damborenea (eds.), 2009. *Introdução a Biologia das Invasões O Mexilhão Dourado na América do Sul: Biologia, dispersão, impacto, prevenção e controle*. Cubo Multimídia Ltda., São Carlos. xv + 245 pp.
- Draparnaud, J. P. R., 1801. *Tableau des mollusques terrestres et fluviatiles de la France*. Renaud, Montpellier/Bossange, Masson et Besson, Paris. 116 pp.
- Giboda, M., O. Ditrich, T. Scholz, T. Viengsay & S. Bouaphanh, 1991. Current status of food-borne parasitic zoonoses in Laos. *Southeast Asian Journal of Tropical Medicine and Public Health*, Supplement **22**: 56–61.
- Guerrero, R. D., III, 2002. Invasive aquatic animals in the Philippines. *ASEAN Biodiversity*, **2**(4): 12–15.
- Hanley, S., 1854. *The Conchological Miscellany. Illustrative of Amphidesma, Pandora, Ostrea, Melo, the Melaniadae, Ampullaria and Cyclostoma*. Williams & Norgate, London & Edinburgh. [1] p., *Ampullaria* pls. 1–4.
- Hayes, K. A., R. H. Cowie, A. Jørgensen, R. Schultheiß, C. Albrecht & S. C. Thiengo, 2009a. Molluscan models in evolutionary biology: Apple snails (Gastropoda: Ampullariidae) as a system for addressing fundamental questions. *American Malacological Bulletin*, **27**: 47–58.
- Hayes, K. A., R. H. Cowie & S. C. Thiengo, 2009b. A global phylogeny of apple snails: Gondwanan origin, generic relationships, and the influence of outgroup choice (Caenogastropoda: Ampullariidae). *Biological Journal of the Linnean Society*, **98**: 61–76.
- Hayes, K. A., R. H. Cowie, S. C. Thiengo, & E. E. Strong, 2012. Comparing apples with apples: Clarifying the identities of two highly invasive Neotropical Ampullariidae (Caenogastropoda). *Zoological Journal of the Linnean Society*, **166**: 723–753.
- Hayes, K. A., R. C. Joshi, S. C. Thiengo & R. H. Cowie, 2008. Out of South America: Multiple origins of non-native apple snails in Asia. *Diversity and Distributions*, **14**: 701–712.
- Horgan, F. G., A. M. Stuart & E. P. Kudavidanage, 2012. Impact of invasive apple snails on the functioning and service of natural and managed wetland. *Acta Oecologica*. doi: 10.1016/j.actao.2012.10.002
- ICZN (International Commission on Zoological Nomenclature), 1954. Rejection for nomenclatorial purposes of the 'Tavola alfabetica delle Conchiglie Adriatiche' and 'Prospetto della Classe dei Vermi' of S. A. Renier commonly attributed to the year 1804. *Opinions and Declarations Rendered by the International Commission on Zoological Nomenclature*, **9**: 91–106.
- ICZN (International Commission on Zoological Nomenclature), 1956. Rejection for nomenclatorial purposes of the work by Renier (S. A.) known as 'Tavole per servire alle classificazione e connescenza degli animali' and commonly attributed to the year 1807 and addition to the 'Official Indexes of Rejected and Invalid Names in Zoology' of certain names first used in the foregoing work or in two earlier works by the same author commonly known as the 'Tavola alfabetica' and the 'Prospetto' respectively and both commonly attributed to the year 1804. *Opinions and Declarations Rendered by the International Commission on Zoological Nomenclature*, **14**: 281–310.
- ICZN (International Commission on Zoological Nomenclature), 1999. *International Code of Zoological Nomenclature. 4th Edition*. The International Trust for Zoological Nomenclature, London. xxix + 306 pp.
- JICA (Japan International Cooperation Agency), 2007. *The Follow-Up Study on the Construction of the Second Mekong Bridge. Final Report*. Japan International Cooperation Agency, Tokyo. 95 + 11 + 19 pp.
- Joordens, J. C. A., F. P. Wesselingh, J. de Vos, H. B. Vonhof & D. Kroon, 2009. Relevance of aquatic environments for hominins: A case study from Trinil (Java, Indonesia). *Journal of Human Evolution*, **57**: 656–671.

- Jørgensen, A., T. K. Kristensen & H. Madsen, 2008. A molecular phylogeny of apple snails (Gastropoda, Caenogastropoda, Ampullariidae) with an emphasis on African species. *Zoologica Scripta*, **37**: 245–252.
- Keawjam, R. S., 1990. The apple snails of Thailand: Molecular genetics. *Journal of Medical and Applied Malacology*, **2**: 1–44.
- Kobelt, 1911–1915. Die Gattung *Ampullaria*. Neue Folge. Abbildungen nach der Natur mit Beschreibungen. *Systematisches Conchylien-Cabinet von Martini und Chemnitz*, **1**(20): 1–236, pls. 22–79. [Published in parts (after Coan et al., 2011: 22 [Annex 2]): pp. 1–24, pls. 22–27 (1911); pp. 25–104, pls. 28–44 (1912); pp. 105–200, pls. 45–68 (1913); pp. 201–216, pls. 69–74 (1914); pp. 217–236, pls. 75–79 (1915)]
- Lamarck, J. B. P. A., 1804. Suite des mémoires sur les fossiles des environs de Paris. *Annales du Muséum national d'Histoire naturelle*, **5**: 28–36.
- Lamarck, J. B. P. A., 1822. *Histoire naturelle des animaux sans vertèbres, présentant les caractères généraux et particuliers de ces animaux, leur distribution, leurs classes, leurs familles, leurs genres, et la citation des principales espèces qui s'y rapportent; précédée d'une Introduction offrant la détermination des caractères essentiels de l'Animal, sa distinction du végétal et des autres corps naturels; enfin, l'exposition des principes fondamentaux de la Zoologie. Tome sixième, 2^{me} partie*. L'Auteur, Paris. 232 pp.
- Linnaeus, C., 1758. *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio Decima, Reformata*. Laurentii Salvii, Holmiae [= Stockholm]. 823 pp.
- Maassen, W. J. M., 2001. A preliminary checklist of the non-marine molluscs of West-Malaysia. 'A handlist'. *De Kreukel*, Extra Editie, **2001**: 1–155.
- Martens, E. von, 1897. Süß- und Brackwasser Mollusken des Indischen Archipels. In: *Zoologische Ergebnisse einer Reise in Niederländisch Ost-Indien herausgegeben von Dr. Max Weber. Band 4, Heft 1*. E. J. Brill, Leiden. 331 pp.
- Morgan, J. de, 1885. Mollusques terrestres et fluviatiles de Royaume de Pérag et des pay voisins (presque'Ile Malaise). *Bulletin de la Société Zoologique de France*, **10**: 353–428, pls. 5–9. [Also issued as an "Extrait du Bulletin de la Société zoologique de France, t. X"]
- Mousson, A., 1848. Über die Land- und Süßwassermollusken von Java. *Mittheilungen der Naturforschende Gesellschaft in Zürich*, **1**: 264–273.
- Mousson, A., 1849. Die Land- und Süßwasser-Mollusken von Java. Nach den Sendungen des Herrn Seminardirektors Zollinger. Friedrich Schulthess, Zürich. iv + 126 pp., pls. 1–22.
- Nevill, G., 1877. *Catalogue of Mollusca in the Indian Museum, Calcutta. Part II.—Fascicule E*. By Order of the Trustees [of the Indian Museum], Calcutta. 306 pp.
- Nevill, G., 1885. *Hand List of Mollusca in the Indian Museum, Calcutta. Part II. Gastropod. Prosobranchia-Neurobranchia (contd.)*. By Order of the Trustees [of the Indian Museum], Calcutta. x + 306 pp.
- Pagulayan, R. C. & E. A. Remigio, 1992. Notes on the family Ampullariidae (Gastropoda: Prosobranchia) in the Philippines: I. Digestive, circulatory, and excretory systems. *Biotropia*, **6**: 1–32.
- Perera, G. & J. G. Walls, 1996. *Apple Snails in the Aquarium*. T. F. H. Publications, USA. 121 pp.
- Petit, R. E., 2012. John Edward Gray (1800–1875): His malacological publications and molluscan taxa. *Zootaxa*, **3214**: 1–125.
- Philippi, R. A., 1849. Centuria tertia Testaceorum novorum (Contin.). *Zeitschrift für Malakozoologie*, **5**: 186–192. [Published Apr. 1849 ("Ausgegeben im April 1849" on p. 192); see also Philippi (1851: 9)]
- Philippi, R. A., 1851–1852. Die Gattung *Ampullaria*. Abbildungen nach der Natur mit Beschreibungen. *Systematisches Conchylien-Cabinet von Martini und Chemnitz*, **1**(20): 1–74, pls. A, 1–21. [Published in parts (see Coan et al., 2011: 21 [Annex 2]): pp. 1–24, pls. A, 1–5 (1851); pp. 25–74, pls. 6–21 (1852)]
- Prashad, B., 1925. Revision of the Indian Ampullariidae. *Memoirs of the Indian Museum*, **8**: 69–89, pls. 13–15.
- Preston, H. B., 1915. *The Fauna of British India Including Ceylon and Burma. Mollusca (Freshwater Gastropoda and Pelecypoda)*. Taylor and Francis, London. xix + 244 pp.
- Purnami, A. T., Sunarto & P. Setyono, 2010. Study of benthos [sic] community based on diversity and similarity index in Cengklik Dam Boyolali. *Jurnal Ekosains*, **2**: 50–65.
- Quoy, J. & J. P. Gaimard, 1834. Animaux mollusques. In: *Voyage de découvertes de l'Astrolabe. Exécuté par ordre du Roi pendant les années 1826-1827-1828-1829, sous le commandement de M. J. Dumont d'Urville. Zoologie. Tome troisième*. J. Tastu, Paris. 954 pp.
- Reeve, L. A., 1856. Monograph of the genus *Ampullaria*. *Conchologia iconica, or, Illustrations of the Shells of Molluscos Animals*, **10**: [31 unnumbered plate captions], pls. 1–28.
- Renier, S. A., 1804. *Tavola alfabetica delle Conchiglie Adriatiche, nominate dietro il Sistema di Linneo, edizione di Gmelin*. Pp. v–xiii. [For date of publication, see Hemming (in ICZN, 1954: 103); work rejected for the purposes of nomenclature (see ICZN, 1954, 1956)].
- Schlotheim, E. F. von, 1818. De Kalkuss Glied der aufgeschwemmten Gebirgsformazion. *Mineralogisches Taschenbuch*, **12**: 315–346.
- Smith, B. D., 2003. Prosobranch gastropods of Guam. *Micronesica*, **35–36**: 244–270.
- Sowerby, G. B., III, 1910. Notes on the family Ampullariidae [continued]. *Proceedings of the Malacological Society of London*, **9**: 56–64.
- Swainson, W., 1823. The specific characters of several undescribed shells. *The Philosophical Magazine and Journal*, **62**: 401–403.

- Tan, S. K., S. Y. Chan & G. R. Clements, 2012. *A Guide to Snails and Other Non-Marine Mollusca of Singapore*. Singapore Science Centre, Singapore. 169 pp.
- Tan, S. K. & H. P. M. Woo, 2010. *A Preliminary Checklist of the Molluscs of Singapore*. Raffles Museum of Biodiversity Research, National University of Singapore, Singapore. 78 pp. Uploaded 2 Jun.2010. http://rmbr.nus.edu.sg/raffles_museum_pub/preliminary_checklist_molluscs_singapore.pdf.
- Traill, W., 1847. A few remarks on conchology and malachology. Comprising brief notices of some of the more remarkable 'Testacea' in Singapore and its neighbourhood; with an appended catalogue of Singapore shells arranged in conformity with 'Lamarck's System'. *Journal of the Indian Archipelago and Eastern India*, **1**: 225–241, 1 pl.
- Vermeulen, J. J. & W. J. M. Maassen, 2003. *The Non-Marine Mollusk Fauna of the Pu Luong, Cuc Phuong, Phu Ly, and Ha Long Regions in Northern Vietnam—A Survey for the Vietnam Programme of FFI (Flora and Fauna International)*. Unpublished report. 35 pp.
- Wagner, J. A., 1827. *Testacea fluviatilia quae in itinere per Brasiliam annis MDCCCXVII–MDCCCXX jussu et auspiciis maximiliani Josephi I. Bavariae Regis Augustissimi Suscepto Collegit et Pingenda Curavit Dr. J. B. de Spix, quondam Ordinis Regii Coronae Bavaricae Civilis Eques, Academiae Scientiarum Bavaricae Socius Ordinarius, Musei Regii Zoologici, Zootomici et Ethnographici Conservator Rel. C. Wolf, Monachii [= Munich]*. [iv] + 36 pp., pls. 1–27.
- Wood, W., 1828. *Supplement to Index Testaceologicus; or a Catalogue of Shells, British and Foreign*. W. Wood, London. iv + [1] + 59 pp., pls. 1–8.

The apple snails of the genus *Pila* (Ampullariidae) are the largest freshwater gastropods in Southeast Asia (SEA), and include some of the earliest taxa described from the region; Linnaeus described *Pila ampullacea* in 1758. Other *Pila* more. A native ampullariid found in Singapore has been recorded as both *Pila conica* (Wood, 1828) and *Pila scutata* (Mousson, 1848). Both names are generally accepted to be synonyms, but the nomenclature remains confused with authors generally more. A native ampullariid found in Singapore has been recorded as both *Pila conica* (Wood, 1828) and *Pila scutata* (Mousson, 1848). The correct name for the native apple snail of Singapore (Gastropoda: Ampullariidae). Nature in Singapore, 6: 55–60.