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Type specimens *vs.* figures: on the identity of some *Oliva* species [1]

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ABSTRACT. Examples of taxonomic errors resulting from faulty interpretation of old figures are reported. *Oliva caldania* Duclos, 1835 is here considered to be a nomen dubium. *O. brettinghami* Bridgman, 1909, *O. emeliodina* Duclos, 1845, *O. jaspidea* Duclos, 1835, *O. nitidula* Duclos, 1835 and *O. picta* Reeve, 1850 are here considered to be valid names. Problems of synonymy are discussed.

RESUME. Des exemples d'erreurs taxonomiques provenant de l'interprétation erronée d'anciennes illustrations sont donnés. *Oliva caldania* Duclos, 1835 est ici considérée être un nomen dubium. *O. brettinghami* Bridgman, 1909, *O. emeliodina* Duclos, 1845, *O. jaspidea* Duclos, 1835, *O. nitidula* Duclos, 1835 and *O. picta* Reeve, 1850 sont ici considérées être des noms valides. Les problèmes de synonymie sont discutés.

KEYWORDS. Mollusca, Gastropoda, Olividae, *Oliva*, systematics, synonymy, *brettinghami*, *caldania*, *emeliodina*, *jaspidea*, *nitidula*, *picta*.

1. INTRODUCTION

1.1. This paper aims at drawing attention to the point that much of the present nomenclatural confusion in the genus *Oliva* stems from the difficulties that are met when comparing specimens with old illustrations.

Only a small number of the existing *Oliva* types have been illustrated, mostly by Kaicher as black-and-white photographs on cards, but this most useful work was published after the last revision (Petuch & Sargent, 1986). No systematic survey of the many existing types has yet been used in a revision of the genus. Few of the authors of monographs on *Oliva* have actually checked the type material. In general (see GREIFENEDER, DUCHAMPS & TURSCH, 1995: 39), *Oliva* species cannot be unambiguously recognised from their original description, so most authors have relied on the original figures.

The genus *Oliva* is so homogeneous that identifications based solely on the interpretation of old figures can sometimes be quite risky. The iconography on *Oliva* is abundant but its quality is highly variable, ranging from totally unrecognisable depictions (in the words of a student: "medieval cartoons") to DUCLOS' superb and generally accurate engravings.

The shells of most *Oliva* species differ mainly by rather subtle differences in shape. This shape can be much distorted when the shell is drawn in an oblique perspective, as it is often the case in old engravings. Interpreting ancient pictorial conventions can also raise problems: shadings can easily be confused with colour markings and *vice versa*. Colour engravings generally convey some idea of the colour pattern, but this is a notoriously variable character for most species in the genus and illustrators appear to have sometimes "embellished" beach-worn specimens (see *O. natalia* Duclos, 1845, herein). Moreover, a drawing emphasises the features that are deemed diagnostical and important by the author, but the taxonomic importance imparted to these characters has changed with the years.

With so many possibilities for errors, it is not surprising that the identity of many *Oliva* species has not been recognised or has been misinterpreted. It will be seen that errors of interpretation did indeed occur, even in the case of high quality illustrations, such as the figures of REEVE and even those of DUCLOS (possibly the best). These are fundamental reference works, so one might assume that they were carefully examined by subsequent authors.

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Errors of interpretation can be of two types. On the one hand, some *Oliva* species have been rashly matched with ambiguous figures. In the case of *O. caldania* Duclos, 1835, discussed herein, one might question whether subsequent authors even bothered with original descriptions. On the other hand, the identity of many species was not recognised from the original illustrations (examples, discussed here under, are: *O. emeliodina* Duclos, 1845, *O. jaspidea* Duclos, 1835, *O. nitidula* Duclos, 1835 and *O. picta* Reeve, 1850).

Most *Oliva* taxa can be safely identified only by referring to type specimens –when existent– or to clear photographs of the type material. Even in these optimal conditions, identification can be fraught with problems. The type lot is sometimes heterogeneous, including specimens of two or more species. The paucity of type specimens often does not allow the estimation of the range of intraspecific variation. It can also happen that the type is a juvenile specimen, sometimes worn beyond recognition. The case (still unsolved) of *Oliva grata* Marrat, 1871 is an example of such a situation.

1.2. Abbreviations.

AMNH: American Museum of Natural History, New York.
AMS: Australian Museum, Sydney.
BM(NH): The Natural History Museum, London.
MCM: Merseyside County Museum, Liverpool.
MNHN: Muséum National d'Histoire Naturelle, Paris.
MLCF: Musée Lecoq, Clermont-Ferrand.
NMSA: Natal Museum, Pietermaritzburg.
NNML: Nationaal Natuurhistorisch Museum, Leiden.
USNM: National Museum of Natural History (Smithsonian Institution), Washington D.C.
ZMA: Zoölogisch Museum, Amsterdam.

1.3. Conventions.

Throughout this text, the convenient device of a semicolon inserted between the specific name and the author [*X-us albus* ; Smith (not Brown)] is used to distinguish between a misidentification, which has no nomenclatural status, and a homonym [*X-us albus* Smith (not Brown)], which has (see MAYR & ASHLOCK 1991: 362).

The names of frequently cited authors are abbreviated, to save on space. So, B. & B. stands for BURCH & BURCH, P. & S. for PETUCH & SARGENT, W. & A. for WAGNER & ABBOTT, Z. & P. for ZEIGLER & PORRECA.

To avoid confusion, "Pl." and "fig(s)." refer to plates and figures in cited works, while "PL." and "FIG(S)." refer to illustrations in the present paper.

1.4. Methodology.

It is easy to demonstrate that two samples are different. It is theoritically impossible to demonstrate that two samples are identical. The best one can do is to report that the samples could not be distinguished by any of the potential discriminants that were tested. The strength of the argument increases with the number of independant tests. Contrary to general belief, the strength of the argument does not depend on the size of the samples that are being compared. Any overlap in the distribution of characters that is demonstrated on small samples will persist (and probably augment) if the size of the samples is increased. Secure conclusions can therefore be reached even when one of the samples consists of a single specimen (for instance, a unique type specimen).

In this study, all efforts were made to demonstrate that samples bearing different names were indeed different. The criteria used to that end were:

1/ computer-assisted biometric comparison, with over fifty characters considered (for details on shell measurements and examples of analysis methods see TURSCH, MISSA & BOUILLON 1992);

2/ detailed colour pattern analysis (for examples, see TURSCH & GREIFENEDER 1996).

It is only after every one of these tests failed to discriminate the samples that we felt compelled to reverse the initial assumption of non-identity.

2. SYSTEMATICS

Family OLIVIDAE Latreille, 1825
Subfamily OLIVINAE Latreille, 1825
Genus *Oliva* Bruguière, 1789

Oliva caldania Duclos, 1835.

Oliva caldania Duclos, 1835: Pl. 6, figs. 3, 4; 1845: 13, Pl. 7, figs. 3, 4.

Oliva caldania Duclos, 1835 is the name unanimously applied today to a common Australian species. Unfortunately, the identity of *O. caldania* Duclos, 1835 cannot be established anymore. No type material could be traced at the MNHN or in the Duclos

collection at MLCF. The illustrations of Duclos (see PL. 1, FIG. 1) are quite enigmatic. The drawings do not show the sharply defined zigzag pattern of the body whorl, characteristic of the Australian species (in which the series of dark markings on the inner edge of the lip can be observed in juvenile specimens). The row of regularly spaced blotches extending along the columella is certainly a rare feature in the genus. The arched columella is more evocative of *Oliva oliva* (Linné, 1758).

The description of DUCLOS (1845: 13) refers to Pl. 7, figs. 3, 4 (labelled *O. caldania*) and figs. 21, 22 (with the caption *O. razamola*). The description is:

"[*o*]*rnée sur son dernier tour de petites taches irrégulières de couleur rousse, et portant sur le côté le plus rapproché de la spire une rangée de petits points ovales rouges qui continue sur les deux avants derniers tours de la spire. La bouche est étroite, le bord droit est également ponctué de rouge. . . .*"

The locality is: "*Habite la Californie*." None of this corresponds to the familiar Australian *O. caldania* ; auct. (not Duclos, 1835), in which the blotches on the spire are not oval but squarish, and not red –at least in live specimens. The markings on the inner lip present in subadult specimens are dark purple-brown, not red.

O. caldania Duclos, 1835 was a synonym of *O. reticularis* Lamarck, 1811 for DUCROS DE SAINT GERMAIN (1857: 55) who, as a director of the Musée Lecocq in Clermont-Ferrand, had access to the Duclos material. Ducros commented:

"Ol. caldania, *Duclos, a été établie avec trois individus jeunes et un peu roulés, chez lesquels les réticulations spirales sont réunies de manière à former de petits points rouges. Le dessin de Duclos est très inexact.*"

Whatever *O. caldania* Duclos, 1835 might be, its open, flaring lip and its heavily accented suprafasciolar band pattern –a row of regularly spaced blotches extending along the columella– warrant that it is *not* the *O. caldania* of later authors (this species has a nearly straight lip and is almost devoid of suprafasciolar ornamentation –a rare feature in *Oliva*). Because both the figures and the description of DUCLOS could apply to dead specimens of several small *Oliva* species, *Oliva caldania* Duclos, 1835 must be considered as a **nomen dubium**.

O. caldania Duclos, 1835 was *O. australis* Duclos, 1835 for B. & B. (1960), a valid name for Z. & P. (1969), W. & A. (1978) and P. & S. (1986).

Oliva brettinghami Bridgman, 1909.

Oliva brettinghami Bridgman, 1909: 203.

Oliva caldania ; auct. (not Duclos, 1835).

Oliva (Proxoliva) caldania queenslandica Petuch & Sargent, 1986: 114, Pl. 19, figs. 5, 6.

Oliva brettinghami Bridgman, 1909. The holotype (H: 18.2 mm; D: 8.3 mm) is at the BM(NH), with six additional paratypes. The locality is "N.W. Australia". The shell (see PL. 1, FIG. 2) is unquestionably the Australian *O. caldania* ; auct. (not Duclos, 1835) [in agreement with the unanimous conclusions of B. & B. (1960), Z. & P. (1969), W. & A. (1978) and P. & S. (1986)]. *O. caldania* Duclos, 1835 being a nomen dubium (see above), *Oliva brettinghami* Bridgman, 1909, the first available name, is **valid**.

Oliva (Proxoliva) caldania queenslandica Petuch & Sargent, 1986. The holotype (H: 12.72 mm; D: 5.82 mm), trawled from 50 m off Cape Moreton, Queensland, by commercial scallop boats, is at AMS C.153539.

Detailed study (see $ 1.4: methodology) of a large series of shells established that the holotype (figured here PL. 1, FIG. 3) is linked by an unbroken chain of intergrades to the usual Western Australian specimens. We are therefore compelled to conclude that *O. caldania queenslandica* Petuch & Sargent, 1986 is a **subjective junior synonym** (at best a local colour form) of *O. brettinghami* Bridgman, 1909.

Oliva emeliodina Duclos, 1845.

Oliva emeliodina Duclos, 1845: 30, Pl. 21, figs. 19, 20.

Oliva sairousa Kilburn, 1980: 221-231.

Oliva emeliodina Duclos, 1845 is represented by six homogeneous syntypes (in two lots) at MNHN [one syntype illustrated by KAICHER (card no. 5541, with the misspelling *emiliodina*)]. The syntype figured by DUCLOS (H: 33.1 mm; D: 15.5 mm), at MNHN (see PL. 1, FIG. 7), matches the description (DUCLOS 1845: 30). The given locality is "*Habite la Cochinchine*." This is the **valid name** of a Western Indian Ocean species, readily separated from the related species *O. caerulea*

(Röding, 1798). *O. emeliodina* Duclos, 1845 has prominent, characteristic columellar plications; it has dull, brownish colour marks on the body whorl; the spire presents fine, brown strokes which are nearly *radially* orientated. *O. caerulea* (Röding, 1798) has very weak columellar plications (in adult shells); has a characteristic pattern of blue an orange double spots (often very contrasted) on the body whorl; the spire presents strokes which are *tangentially* orientated –as in most *Oliva* species.

This taxon was *O. caerulea* (Röding, 1798) (or its junior synonym *O. episcopalis* Lamarck, 1811, see GREIFENEDER, DUCHAMPS & TURSCH, 1995) for DUCROS de SAINT GERMAIN (1857: 75, with the misspelling "*emelliodina*"), B. & B. (1960), B. & B. (1967), W. & A. (1978), Z. & P. (1969) and for P. & S. [1986 –in which Pl. 9, figs. 27, 28 do indeed depict *O. caerulea* (Röding, 1798)].

Oliva sairousa Kilburn, 1980. The holotype (H: 33.61 mm; D: 16.82 mm), from Bahia das Cocos, Jangamo dist., Mozambique, NMSA 59937/T2279. is figured PL. 1, FIG. 8. Paratype 1, NMSA T 2281, (H: 27.98 mm; D: 12.36 mm), beach at Mossongulo near Massinga. Mozambique, no. 12.1973, has also been examined. Another paratype at the Natal Museum was illustrated by KAICHER, card no. 5499.

Detailed study (see $ 1.4: methodology) of a large series of shells failed to produce any objective criterion by which the type material of *O. sairousa* Kilburn, 1980 could be separated from *O. emeliodina* Duclos, 1845. We are therefore compelled to conclude that *O. sairousa* Kilburn, 1980 is is a **subjective junior synonym** of *O. emeliodina* Duclos, 1845. This opinion is now entirely shared by Dr. KILBURN himself (private communication, 13/5/96).

O. sairousa Kilburn, 1980 –under the misspelling "*sairoosa*"– was a valid name for P. & S. (1986).

Oliva jaspidea Duclos, 1835.

Oliva jaspidea Duclos, 1835: Pl. 6, figs. 9, 10; 1845: 13.

Oliva esiodina Duclos, 1845: 18, Pl. 16 , figs. 19-20.

Oliva duclosi Reeve, 1850: Pl. 19, fig. 44.

Oliva duclosiana Jay, 1850: 367.

Oliva lentiginosa Reeve, 1850: Pl. 19, fig. 45, a, b.

Oliva jaspidea Duclos, 1835 is represented by 5 homogeneous syntypes at MNHN, one of which (H: 19.4 mm; D: 8.2 mm) is here figured PL. 2, FIG. 14. The locality given by Duclos (1845: 13) is "*Habite La Nouvelle Hollande et Otahiti, d'après Mr. Cuming.*"

Detailed study (see $ 1.4: methodology) of a large series of shells failed to produce any objective criterion by which the type material of *O. jaspidea* Duclos, 1835 could be separated from *O. duclosi* Reeve, 1850 [in agreement with the unanimous conclusions of B. & B. (1960), Z. & P. (1969), W. & A. (1978) and P. & S. (1986)]. We are therefore compelled to conclude that *O. jaspidea* Duclos, 1835 is the **valid** name of the shell widely known today as *O. duclosi* Reeve, 1850.

Voluta jaspidea (Gmelin, 1791) (later transferred to the genus *Oliva* by Fischer, 1807) now stands in another genus (*Jaspidella*, in the subfamily Olivellinae, see ABBOTT 1974: 233). So, in application of Article 59c of the Code, *O. jaspidea* Duclos, 1835 is not to be rejected as a secondary junior homonym of *O. jaspidea* (Gmelin, 1791), as erroneously stated by TURSCH & GREIFENEDER (1989a).

Oliva duclosiana Jay, 1850 is represented by two homogeneous specimens in the Jay collection at AMNH. One of these (H: 26.00 mm; D: 12.05 mm), AMNH 89390, no locality, from the Jay collection, is herein figured PL. 2, FIG. 16.

Detailed study (see $ 1.4: methodology) of a large series of shells failed to produce any objective criterion by which the type material of *O. duclosiana* Jay, 1850 could be separated from *O. jaspidea* Duclos, 1835. We are therefore compelled to conclude that *O. duclosiana* Jay, 1850 is a **subjective junior synonym** of *O. jaspidea* Duclos, 1835.

O. duclosiana Jay, 1850 was *O. duclosi* Reeve, 1850 for B. & B. (1960), Z. & P. (1969), W. & A. (1978) and P. & S. (1986).

Oliva esiodina Duclos, 1845 is represented by two light-coloured, somewhat gerontic syntypes at MNHN. The syntype figured by DUCLOS (H: 32.2 mm; D: 14.7 mm, previously illustrated by KAICHER, card no. 5255) is here illustrated PL. 2, FIG. 18. The locality given by Duclos (1845: 19) is "*Habite La Nouvelle Guinée.*"

Detailed study (see $ 1.4: methodology) of a large series of shells failed to produce any objective criterion by which the type material of *O. esiodina* Duclos, 1845 could be

separated from *O. jaspidea* Duclos, 1835. We are therefore compelled to conclude that *O. esiodina* Duclos, 1845 is a **subjective junior synonym** of *O. jaspidea* Duclos, 1835.

O. esiodina Duclos, 1845 was a valid name for TURSCH & GREIFENEDER (1989a), *O. duclosi* Reeve, 1850 for B. & B. (1960), B. & B. (1967), Z. & P. (1969) and W. & A. (1978). It was a valid name for P. & S. (1986) but *O. esiodina* ; Petuch & Sargent (not Duclos, 1845), 1986, figured Pl. 1, figs. 15, 16 is *O. chrysoplecta* Tursch & Greifeneder, 1989.

Oliva duclosi Reeve, 1850 is represented by three homogeneous syntypes in BM(NH) 1987006. One syntype (H: 28.9 mm; D: 13.3 mm), previously illustrated by KAICHER (card no. 5241), is illustrated PL. 2, FIG. 15. The original label reads: "H. CUMING colln. Philippine Islands (Isle of Luzon) + Society Islands". This taxon has been demonstrated (TURSCH & GREIFENEDER (1989a) to be a subjective junior synonym of *O. esiodina* Duclos, 1845. It thus becomes a **subjective junior synonym** of *O. jaspidea* Duclos, 1835.

O. duclosi Reeve, 1850 was a valid name for Z. & P. (1969), W. & A. (1978), and P. & S. (1986).

Oliva lentiginosa Reeve, 1850 is represented by two homogeneous syntypes from the STEERE collection, no locality given, in BM(NH) 1892.2.24.2-4. One syntype has been previously illustrated by KAICHER (card no. 5175). The other syntype (H: 30.3 mm; D: 13.4 mm) is illustrated here PL. 2, FIGS. 17. This has been shown (TURSCH & GREIFENEDER (1989a) to be a subjective junior synonym (colour form) of *O. esiodina* Duclos, 1845. It thus becomes a **subjective junior synonym** of *O. jaspidea* Duclos, 1835.

O. lentiginosa Reeve, 1850 was *O. duclosi* Reeve, 1850 for B. & B. (1960), B. & B. (1967), Z. & P. (1969) and W. & A. (1978). It was a valid name for P. & S. (1986), but *O. lentiginosa* ; Petuch & Sargent (not Reeve, 1850), 1986, figured Pl. 1, figs. 7, 8, is another species, most probably *O. panniculata* Duclos, 1835.

The following names have been mistakenly or questionably considered as synonyms:

Oliva natalia Duclos, 1845: 23 (Pl. 21, figs. 17-18) was considered to be *O. duclosi* Reeve, 1850 by B. & B. (1960), B. & B. (1967), Z. & P. (1969) and W. & A. (1978). This probably stems from the comments of DUCROS DE SAINT GERMAIN (1857: 59):

> "Ol. natalia, *Duclos, est une* Ol. duclosi type, *qui a été roulée et décolorée. La figure qu'il en donne a été grandie, rougie et embellie à plaisir.*"

It was a valid name for P. & S. (1986), but *O. natalia* ; Petuch & Sargent (not Duclos, 1845), 1986, figured Pl. 2, figs. 11, 12, is another species, most probably *O. panniculata* Duclos, 1835.

The identity of *O. natalia* Duclos, 1845 cannot be established anymore. No type material could be traced at the MNHN or in the Duclos collection at MLCF. The illustrations of DUCLOS (1845: Pl. 21, figs. 17-18) are very ambiguous. The description of DUCLOS (1845: 23):

> "*Petite coquille légèrement anguleuse dans le haut de son dernier tour, entièrement teinte de couleur rouille, surchargée d'une multitude de petites taches blanches trigones. Spire courte, composée seulement de trois tours; ouverture étroite; bord columellaire en totalité plissé d'une manière uniforme et de plis fort gros au nombre de onze. Longueur, 20 millimètres. Habite la Chine. Rarissime.*"

is equally enigmatic. It is certainly safer to consider *O. natalia* Duclos, 1845 as a **nomen dubium**.

Oliva grata Marrat, 1871 is represented by a small, reddish, beach-worn holotype (H: 24.3 mm, D: 10.8 mm) at MCM, previously illustrated by KAICHER (card no. 5567).

This enigmatic shell (without any locality data) has caused much confusion. It was *O. ?caroliniana* Duclos, 1835 for SOWERBY (in MARRAT, 1871: 41); *O. stainforthii* (misspelling for *stainforthi*) Reeve, 1850 for TOMLIN (in FORD 1953: 445); *O. lentiginosa* Reeve, 1850 for B. & B. (1960) and W. & A. (1978). It was a colour form of *O. sidelia* Duclos, 1840 for P. & S. (1986), but *O. sidelia* ; Petuch & Sargent (not Duclos, 1840), 1986, of which the "colour form *grata*" is figured (*Atlas* Pl. 8, figs. 33, 34), is another species, most probably *O. carneola* (Gmelin, 1791) var. *adspersa* Dautzenberg, 1927.

The identity of *O. grata* Marrat, 1871 is not yet clear to us but, whatever it might be, it is certainly not *O. jaspidea* Duclos, 1835.

Oliva stainforthi Reeve, 1850 was considered to be *O. duclosi* Reeve, 1850 by Z. & P. (1969) and P. & S. (1986), *O. lentiginosa* Reeve, 1850 by W. & A. (1978). The identity of *O.*

stainforthi Reeve, 1850 has now been established: it is a subjective junior synonym of *O. atalina* Duclos, 1835 (see TURSCH & GREIFENEDER 1996).

Oliva nitidula Duclos, 1835.

Oliva nitidula Duclos, 1835: Pl. 10, figs. 3-4; 1845: 13, Pl. 11, figs. 3, 4.

Oliva paxillus Reeve, 1850: Pl. 21, sp. a-b,
Oliva sandwicensis Pease, 1860: 145.
Oliva thomasi Crosse, 1861: 173, Pl. 6, figs. 3-4.
Oliva (Omogymna) leonardi Petuch & Sargent, 1986: 110, Pl. 39, figs. 11, 12.

Oliva nitidula Duclos, 1835 is represented by 22 syntypes, in six lots, at MNHN. Five of these lots bear a later label of DUCROS DE SAINT GERMAIN: "*Oliva reticularis*". One lot, with a label "*Oliva ozodona*" (also of DUCROS DE SAINT GERMAIN), no locality given, contains four homogeneous syntypes of *O. nitidula*, all presenting the callus step typical of the proposed subgenus *Omogymna* von Martens, 1897 (for details on the structure of this feature, see TURSCH & MACHBAETE 1995). One syntype has been illustrated by KAICHER (card no. 5477). The specimen figured by DUCLOS (H: 19 mm; D: 11 mm) is illustrated here PL. 2, FIG. 9. The locality given by DUCLOS (1845: 13) is "*Habite La Nouvelle Hollande*."

O. nitidula (Dillwyn, 1817) now stands in another genus (it is *Olivella minuta* Link, 1807, see W & A. 1978). Likewise, the fossil *O. nitidula* Deshayes, 1835 (from the Paris region) is also not in the genus *Oliva*. Its redescription in DESHAYES & MILNE EDWARDS (1844: 637) idicates that it is most probably an Ancillid. So, in application of Article 59 c of the Code, *O. nitidula* Duclos, 1835 is not to be rejected as a secondary junior homonym of *O. nitidula* (Dillwyn, 1817) or of *O. nitidula* Deshayes, 1835.

Detailed study (see $ 1.4: methodology) of a large series of shells failed to produce any objective criterion by which the type material of *O. nitidula* Duclos, 1835 could be separated from *O. paxillus* Reeve, 1850. We are thus compelled to conclude that *O. nitidula* Duclos, 1835 is the **valid** name of the shell widely known today as *O. paxillus* Reeve, 1850 [as previously suggested by W. & A. (1978) and by KAICHER (1989)].

O. nitidula Duclos, 1835 was a valid name for P. & S. (1986) –but *O. nitidula* ; Petuch & Sargent (not Duclos, 1835), 1986, figured Pl. 2, figs. 9, 10, is another species, *O. panniculata* Duclos, 1835. *O. nitidula* is a very widespread species, quite variable in shape, in colour, and especially in the shape and the position of the characteristic line marking a discontinuity in the enamel on the body whorl.

Oliva paxillus Reeve, 1850 is represented by 1+2 homogeneous specimens at BM(NH), one with the label: "Holotype H. CUMING colln. Loc.:? "Mauritius" added to the board later - two non-type specimens removed to general collection. ". The type (H: 27.2 mm; D: 12.2 mm) is figured here on PL. 2, FIG. 10. This is here considered to be a **subjective junior synonym** of *O. nitidula* Duclos, 1835, from which it could not be separated in any way (see above, under *O. nitidula*).

O. paxillus Reeve, 1850 was a valid name for Z. & P. (1969), W. & A. (1978) and P. & S. (1986).

Oliva sandwicensis Pease, 1860 is represented by a lectotype [BM(NH) 1961188] and a paralectotype [BM(NH) 1961189], selected by KAY (1965). The label states: "H. CUMING colln: Sandwich Islands ....". The lectotype (H: 27.2 mm; D: 13.0 mm) is here figured PL. 2, FIG. 11.

Detailed study (see $ 1.4: methodology) of a large series of shells failed to produce any objective criterion by which the type material of *O. sandwicensis* Pease, 1860 could be separated from *O. nitidula* Duclos, 1835. We are therefore compelled to conclude that *O. sandwicensis* Pease, 1860 is a **subjective junior synonym** (at best a local form) of *O. nitidula* Duclos, 1835.

O. sandwicensis Pease, 1860 –under the misspelling "*sandwichensis*"– was a valid name for P. & S. (1986). It was *O. paxillus* Reeve, 1850 for W. & A. (1978) as for (under the misspelling "*sandwichiensis*") B. & B. (1960) and Z. & P. (1969).

Oliva thomasi Crosse, 1861 is represented by the holotype (H: 26.8 mm; D:11.4 mm) at BM(NH), here figured PL. 2, FIG. 13, locality "*Habitat in insula Taïti dicta.*"

Detailed study (see $ 1.4: methodology) of a large series of shells failed to produce any objective criterion by which the type of *O. thomasi* Crosse, 1861 could be separated from *O. nitidula* Duclos, 1835. We are therefore compelled to conclude that *O. thomasi* Crosse, 1861 is a **subjective junior synonym** of *O. nitidula* Duclos, 1835.

This was *O. paxillus* Reeve, 1850 for B. & B. (1960), Z. & P. (1969), W. & A. (1978) and P. & S. (1986).

Oliva (Omogymna) leonardi Petuch & Sargent, 1986 is represented by the holotype (H: 12.90 mm; D: 5.51 mm) USNM 841461 , caught in 30 m off Durban, South Africa, here figured PL. 2, FIG. 12. This is a dead, very discoloured specimen.

Detailed study (see $ 1.4: methodology) of a large series of shells failed to produce any objective criterion by which the type of *O. leonardi* Petuch & Sargent, 1986 could be separated from *O. nitidula* Duclos, 1835. We are thus compelled to conclude that *O. leonardi* Petuch & Sargent, 1986 is a **subjective junior synonym** of *O. nitidula* Duclos, 1835. The position at mid-body of the enamel discontinuity line, claimed to be characteristic of this taxon, is in fact very variable. Examination of many specimens from the type locality, including shells with a very normal, oblique "*Omogymna* line", establishes that the position and shape discontinuity line are highly variable.

Oliva picta Reeve, 1850.

Oliva picta Reeve, 1850: Pl. 26, fig. 79.

Oliva ceramensis Schepman, 1904: 68-69.

Oliva (Galeola) insecta Petuch & Sargent, 1986: 84, Pl. 8, figs. 27-30.

Oliva picta Reeve, 1850 is represented by 3 homogeneous syntypes at BM(NH), one of which was illustrated by KAICHER (card no. 5227). The label bears: "Philippine Islands, H. CUMING colln." One syntype (H: 15.6 mm; D: 8.4 mm) is figured here on PL. 1, FIG. 4.

Detailed study (see $ 1.4: methodology) of a large series of shells failed to produce any objective criterion by which the type material of *O. picta* Reeve, 1850 could be separated from *O. ceramensis* Schepman, 1904 [as previously suggested by KAICHER (1989)]. We are thus compelled to conclude that *O. picta* Reeve, 1850 is the **valid** name of the shell widely known today as *O. ceramensis* Schepman, 1904.

O. picta Reeve, 1850 was *O. dactyliola* Duclos, 1835 for B. & B. (1960) and W. & A. (1978). It was a valid name for P. & S. (1986), but *O. picta* ; Petuch & Sargent (not Reeve, 1850), 1986, figured Pl. 7, figs. 5, 6, is another species, most probably *O. dactyliola* Duclos, 1835.

Oliva ceramensis Schepman, 1904 is represented at ZMA by one fresh syntype (the label says: "1 Lectotype from Ceram, Waru Bay, Sta. 174", but the designation of a lectotype was apparently never published) and two worn syntypes, from deep water off Ceram Island, Indonesia. The syntype (H: 14.2 mm; D: 7.8 mm) ZMA 3.11.104, is figured here on PL. 1, FIG. 5. Another syntype is at NNML.

We are compelled to conclude that *O. ceramensis* Schepman 1904 is a **subjective junior synonym** of *O. picta* Reeve, 1850 because detailed study of a large series (see above under *O. picta*) failed to produce any criterion by which the two taxa could be separated.

O. ceramensis Schepman 1904 was a valid name for Z. & P. (1969), W. & A. (1978) and P. & S. (1986), and was *O. carneola* (Gmelin, 1791) for B. & B. (1960) (under the misspelling "*ceramansis*").

Oliva (Galeola) insecta Petuch & Sargent, 1986 is represented by the holotype (H: 12.32 mm; D: 6.57 mm), trawled in 100 m, Davao Bay, Mindanao, Philippines, USNM 841437, illustrated PL. 1, FIG. 6. This is a dead shell, still filled with black and white fine sand and bearing on the spire a scar made by a drilling predator (possibly a *Naticidae*).

This specimen could not be separated (see $ 1.4: methodology) from large samples of *Oliva picta* Reeve, 1850 (from the North Coast of Papua New Guinea, not distinguishable from the type) except for details in the arrangement of colour spots of the body whorl. In the genus *Oliva*, such differences are fully expected to be found between conspecific populations (VAN OSSELAER et al. 1993, TURSCH 1994, TURSCH 1995) and do not constitute interspecific discriminants. We are therefore compelled to conclude that *O. insecta* Petuch & Sargent, 1986 is a **subjective junior synonym** (at best a local colour form) of *Oliva picta* Reeve, 1850.

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INDEX TO NAMES (valid taxa in **bold**).

O. brettinghami Bridgman, 1909: valid.
O. caldania Duclos, 1835: nomen dubium
O. caldania queenslandica Petuch & Sargent, 1986: subjective junior synonym of *O. brettinghami* Bridgman, 1909.
O. ceramansis Schepman (auct.): misspelling for *O. ceramensis* Schepman 1904.
O. ceramensis Schepman 1904: subjective junior synonym of *O. picta* Reeve, 1850.
O. duclosi Reeve, 1850: subjective junior synonym of *O. jaspidea* Duclos, 1835.
O. duclosiana Jay, 1850: subjective junior synonym of *O. jaspidea* Duclos, 1835.
O. emeliodina Duclos, 1845: valid.
O. emelliodina Duclos (auct.): misspelling for *O. emeliodina* Duclos, 1845.
O. emiliodina Duclos (auct.): misspelling for *O. emeliodina* Duclos, 1845.
O. esiodina Duclos, 1845: subjective junior synonym of *O. jaspidea* Duclos, 1835.
O. grata Marrat, 1871: identity not yet established.
O. insecta Petuch & Sargent, 1986: subjective junior synonym of *O. picta* Reeve, 1850.
O. jaspidea Duclos, 1835: valid.
O. lentiginosa Reeve, 1850: subjective junior synonym of *O. jaspidea* Duclos, 1835.
O. leonardi Petuch & Sargent, 1986: subjective junior synonym of *O. nitidula* Duclos, 1835.
O. natalia Duclos, 1845: nomen dubium.
O. nitidula Duclos, 1835: valid.
O. paxillus Reeve, 1850: subjective junior synonym of *O. nitidula* Duclos, 1835.
O. picta Reeve, 1850: valid.
O. sandwicensis Pease, 1860: subjective junior synonym of *O. nitidula* Duclos, 1835.
O. sandwichensis Pease (auct.): misspelling for *O. sandwicensis* Pease, 1860.
O. sandwichiensis Pease (auct.): misspelling for *O. sandwicensis* Pease, 1860.
O. sairoosa Kilburn (auct.): misspelling for *O. sairousa* Kilburn, 1980.
O. sairousa Kilburn, 1980: subjective junior synonym of *O. emeliodina* Duclos, 1845.
O. thomasi Crosse, 1861: subjective junior synonym of *O. nitidula* Duclos, 1835.

REFERENCES.

ABBOTT, R.T. 1974. *American Seashells*. Van Nostrand, N.Y.

BRIDGMAN, F.G. 1909. Description of a new species of *Oliva*. *Proc. Malac. Soc. London* 8(4): 203.

BURCH, J.Q. & R.L. BURCH 1960. *Catalog of recent and fossil Olives*. Minutes of the Conchological Club of Southern California 196: 1-46.

BURCH, J.Q. & R.L. BURCH 1967. The family Olividae. *Pac. Sci.* 21(4): 503-522.

CROSSE, H. 1861. Description d'espèces nouvelles. *Jour. de Conch.* 9: 171-173.

DESHAYES, G.P. & H. MILNE EDWARDS 1844. *Histoire naturelle des animaux sans vertèbres ... par J.B.P.A. de Lamarck*. Baillière, Paris.

DUCLOS, P.L. 1835, 1840. *Histoire naturelle générale et particulière de tous les genres de coquilles univalves marines à l'état vivant et fossile*, publiée par monographies. Genre Olive. Paris.

DUCLOS, P.L. 1844-48. *Oliva* in J.C. CHENU, *Illustrations Conchyliologiques, ou description et figures de toutes les coquilles connues, vivantes et fossiles*. 4 vols. 85 livraisons, Paris.

DUCROS de SAINT GERMAIN, A.M.P. 1857. *Revue critique du Genre* Oliva *de Bruguière*. Fernand Thibaud. Clermont.

FISCHER von WALDHEIM, G. 1807. *Museum Demidoff ou Catalogue systématique et raisonné des Curiosités de la Nature et de l'Art*, donnés à l'Université Impériale de Moscou par Son Excellence Monsieur Paul de Demidoff. Tome Troisième: Végétaux et Animaux. Moscow.

FORD, W.K. 1953. Notes by J.R. le B. Tomlin, M.A. on the Marrat's species of *Oliva*. *The North Western Naturalist* 24: 442-449.

GMELIN, J.F. 1791. *Caroli a Linné systema naturae per regna tria naturae*. Editio decima teria, auctata, reformata. Vol. 1, pers. 6. Vermes: 3021-3910. Leipzig.

GREIFENEDER, D., R. DUCHAMPS & B. TURSCH 1995. Studies on Olividae. XXIII. The Lamarckian names for *Oliva* species. *Apex* 10(2/3): 39-60.

JAY, J.C. 1850. *A catalogue of the shells ... contained in the collection of J. C. Jay*. 4th edition, Craighead, New York.

KAICHER, S.D. 1989. Card catalogue of world wide shells. Pack 54. Olividae part IV. St. Petersburg, Florida.

KAY, A. 1965. Marine molluscs in the Cuming collection, British Museum (Natural History) described by William Harper Pease. *Bull. B. M. (N.H.) Zool. suppl.* 1: 25, pl. 3, figs. 9, 10.

KILBURN, R.N. 1980. The genus *Oliva* in Southern Africa and Mozambique. *Ann. Natal Mus.* 24(1): 221-231.

MARRAT, F.P. 1870-71. *Oliva* Bruguières. In G.B. SOWERBY, *Thesaurus Conchyliorum*.

PEASE, W.H. 1860. Descriptions of new species of Mollusca from the Sandwich Islands. *Proc. Zool. Soc. London* 28: 145.

PETUCH, E.J. & D.M. SARGENT 1986. *Atlas of the living olive shells of the world*. CERF Editions, Charlottesville, VA.

REEVE, L. 1850. *Conchologia iconica or illustrations of the shells of molluscous animals*. Monograph of the genus *Oliva*, pls. 1-30, London.

SCHEPMAN, M.M. 1904. Descriptions of three new species of *Oliva* from the Siboga expedition. *Tijd. Nederl. Dierk. Vereen.*5: 67-69.

TURSCH, B. 1994. Studies on Olividae XXI. The scale of sympatry in the genus *Oliva*. *Apex* 9(4): 131-142.

TURSCH, B. 1995. Micro-endemism, allotopy and taxonomy in the genus *Oliva*. *Abstr. 12th Intl. Malac. Congr.*, Vigo: 107-109.

TURSCH, B. & D. GREIFENEDER 1989a. Studies on Olividae. X. The taxonomic status of *Oliva esiodina* Duclos, 1844, *O. duclosi* Reeve, 1850 and *O. lentiginosa* Reeve, 1850. *Apex* 4(4): 57-68.

TURSCH, B. & D. GREIFENEDER 1989b. Studies on Olividae. XI. *Oliva chrysoplecta* sp. n., a familiar, undescribed Western Pacific species. *Apex* 4(4): 69-84.

TURSCH, B. & Y. MACHBAETE 1995. The microstructure of the shell in the genus *Oliva*. (Studies on Olividae. 24). *Apex* 10(2/3): 61-78.

TURSCH, B. & D. GREIFENEDER 1996. The "*Oliva miniacea* complex", with the description of a familiar, unnamed species. (Studies on Olividae. 25). *Apex* 11(1): 1-49.

TURSCH, B., O. MISSA & J. BOUILLON 1992. Studies on Olividae XIV. The taxonomic structure of *Oliva oliva* (auct.). *Apex* 7(1): 3-22.

VAN OSSELAER, C., J. BOUILLON, J.M. OUIN & B. TURSCH. 1993. Studies on Olividae XVIII. The distribution of *Oliva* species and the variation of their colour patterns in Hansa Bay (Papua New Guinea). *Apex* 9(2/3): 29-46.

WAGNER, R.J.L. & R.T. ABBOTT 1967. *Standard Catalog of Shells*. 2nd. edition. American Malacologists Inc., Greenville, Delaware.

ZEIGLER, R.F. & H.C. PORRECA 1969. *Olive shells of the world*. Rochester Polychrome Press, Rochester, N.Y.

Plate 1 (opposite).

Scale bars: 10 mm.

1. *Oliva caldania* Duclos, 1835: illustrations Pl. 6, figs. 3, 4.

2. ***Oliva brettinghami*** Bridgman, 1909. Holotype (H: 18.2 mm; D: 8.3 mm), "N.W. Australia" BM(NH).
3. *Oliva caldania queenslandica* Petuch & Sargent, 1986. Holotype (H: 12.72 mm; D: 5.82 mm), trawled from 50 m off Cape Moreton, Queensland, AMS C.153539.

4. ***Oliva picta*** Reeve, 1850. One (H: 15.6 mm; D: 8.4 mm) of three syntypes, "Philippine Islands, H. CUMING colln.", BM(NH).
5. *Oliva ceramensis* Schepman, 1904. Syntype (H: 14.2 mm; D: 7.8 mm), from deep water off Ceram Island, Indonesia, ZMA 3.11.104.
6. *Oliva insecta* Petuch & Sargent, 1986. Holotype (H: 12.32 mm; D: 6.57 mm), trawled in 100 m, Davao Bay, Mindanao, Philippines, USNM 841437.

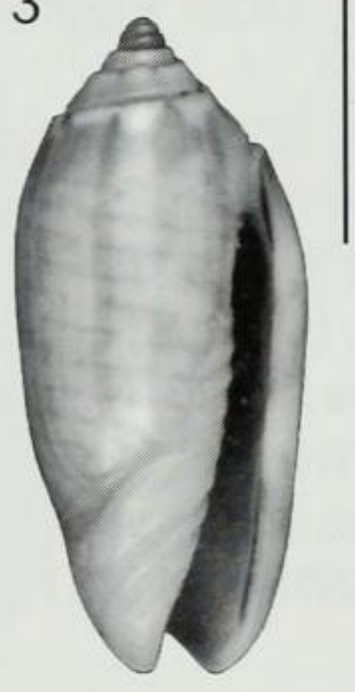
7. ***Oliva emeliodina*** Duclos, 1845. Figured syntype (H: 33.1 mm; D: 15.5 mm), "*Habite la Cochinchine*", MNHN.
8. *Oliva sairousa* Kilburn, 1980. Holotype (H: 33.61 mm; D: 16.82 mm), "Bahia das Cocos, Jangamo dist., Mozambique", NMSA 59937/T2279.

Plate 1

1

2

3



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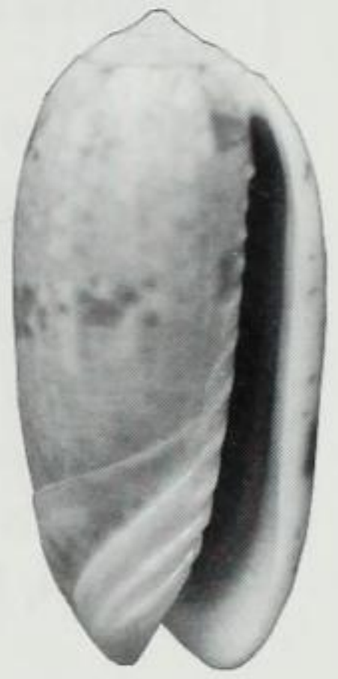

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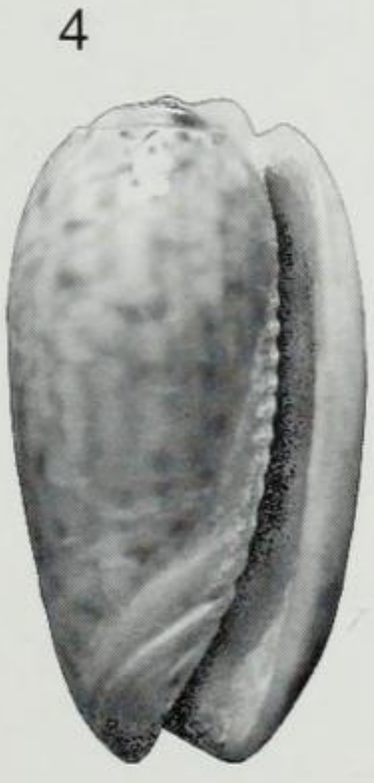

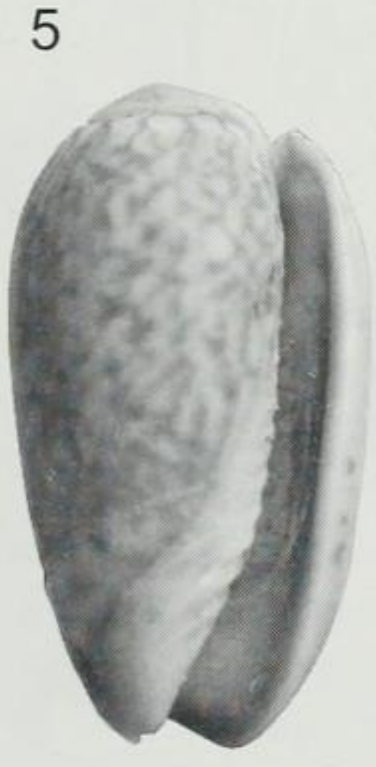

Plate 2 (opposite).

Scale bars: 10 mm.

9. *Oliva nitidula* Duclos, 1835. Figured syntype (H: 19 mm; D: 11 mm), no locality, MNHN.
10. *Oliva paxillus* Reeve, 1850. Holotype (H: 27.2 mm; D: 12.2 mm) with label "Holotype H. CUMING colln. Loc.:? "Mauritius" added to the board later ...", BM(NH).
11. *Oliva sandwicensis* Pease, 1860. Lectotype (H: 27.2 mm; D: 13.0 mm) "H. CUMING colln: Sandwich Islands", BM(NH).
12. *Oliva thomasi* Crosse, 1861. Holotype (H: 26.8 mm; D:11.4 mm), "*Habitat in insula Taïti dicta*.", BM(NH).
13. *Oliva leonardi* Petuch & Sargent, 1986. Holotype (H: 12.90 mm; D: 5.51 mm), off Durban, South Africa, USNM 841461.

14. *Oliva jaspidea* Duclos, 1835. One (H: 19.4 mm; D: 8.2 mm) of five syntypes, "*Habite La Nouvelle Hollande et Otahiti, d'après Mr. Cuming*", MNHN.
15. *Oliva duclosi* Reeve, 1850. One (H: 28.9 mm; D: 13.3 mm) of three syntypes, "H. CUMING colln. Philippine Islands (Isle of Luzon) + Society Islands", BM(NH) 1987006.
16. *Oliva duclosiana* Jay, 1850. One (H: 26.00; D: 12.05 mm) of two specimens in the Jay collection, no locality, AMNH 89390.
17. *Oliva lentiginosa* Reeve, 1850. One (H: 30.3 mm; D: 13.4 mm) of two syntypes, no locality, Steere collection, BM(NH) 1892.2.24.2-4.
18. *Oliva esiodina* Duclos, 1845. Figured syntype (H: 32.2 mm; D: 14.7 mm), "*Habite La Nouvelle Guinée*", MNHN.

Plate 2


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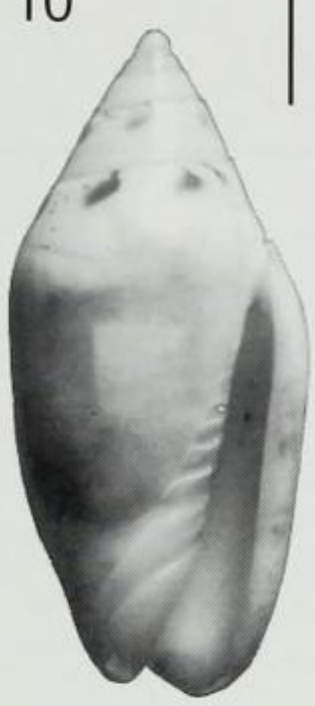
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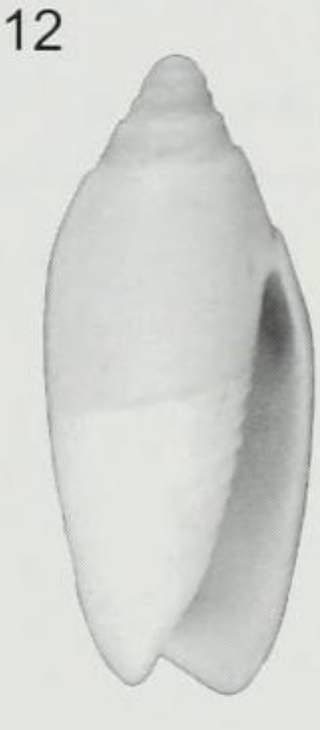
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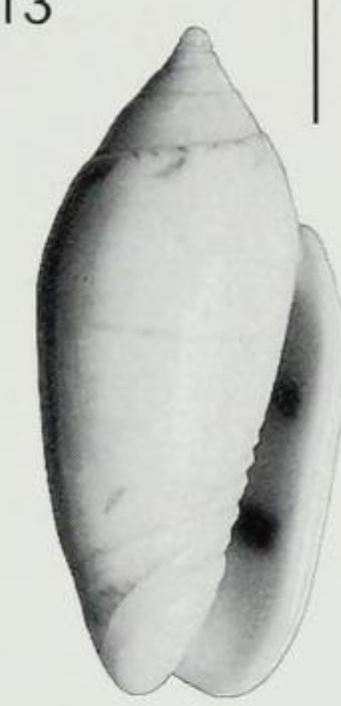
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