Bollettino della Società Paleontologica Italiana, 47 (1), 2008, 45-49. Modena, 30 aprile 2008

A new species of *Tanousia* Servain (Gastropoda, Hydrobiidae) from the Early Pleistocene of Emilia-Romagna (Northern Italy)

Daniela ESU

D. Esu, Dipartimento di Scienze della Terra, Università "La Sapienza" and IGAG, CNR, P.le A. Moro 5, I-00185 Roma, Italy; daniela.esu@uniroma1.it

KEY WORDS - Freshwater gastropods, Hydrobiidae, Tanousia, *New species, Early Pleistocene, Northern Italy.*

ABSTRACT - A new extinct freshwater prosobranch species of the genus Tanousia *Servain, 1881,* Tanousia stironensis *n. sp., of the family Hydrobiidae, is described. It has been discovered in Lower Pleistocene non-marine clayey-sandy deposits of the Stirone River succession (Emilia-Romagna, Northern Italy), well known from a geological and palaeontological point of view. The ecological features of the molluscan assemblages, in which* Tanousia stironensis *n. sp. widely occurs, suggest that the new species loved slow-current freshwater and warm-temperate climate conditions.*

RIASSUNTO - [Una nuova specie del genere *Tanousia* Servain, 1881 (Gastropoda, Hydrobiidae) del Pleistocene inferiore dell'Emilia-Romagna (Italia settentrionale)] - *Viene descritta una nuova specie estinta di gasteropode del genere* Tanousia *Servain, 1881,* Tanousia stironensis *n. sp., della Famiglia Hydrobiidae. Questa specie è rappresentata da un gran numero di esemplari rinvenuti in strati continentali, sabbioso-argillosi, riferibili al Pleistocene inferiore, facenti parte della ben nota successione sedimentaria miocenica-pleistocenica del Torrente Stirone. I depositi continentali fossiliferi, attualmente compresi nel Parco Fluviale Regionale dello Stirone, affiorano lungo il corso del torrente, a monte della confluenza con il Fiume Taro, fra S. Nicomede e Laurano, in provincia di Parma (Emilia-Romagna, Italia settentrionale). In questo tratto fluviale è riconosciuta una fase regressiva pleistocenica inferiore, comprendente un episodio continentale, poggiante su sedimenti marini tramite una superficie di erosione, seguito da due episodi lagunari. Le specie accompagnanti* T. stironensis *sono rappresentate da gasteropodi continentali prosobranchi ed heterobranchi, fra cui si rinviene un elemento termofilo, e bivalvi dulcicoli. Le caratteristiche ecologiche dell'associazione in cui la nuova specie è abbondantemente rappresentata, suggeriscono che* T. stironensis *fosse caratteristica di ambiente fluviatile ad acque a lento scorrimento e condizioni climatiche temperato-calde.*

INTRODUCTION

South of the Po valley, along the Stirone stream before the confluence with Taro river (Parma Province, Northern Italy; Fig. 1), a well-known upper Miocene-Pleistocene succession, nearly 1000 m thick, crops out. In the seventies the Stirone sedimentary succession has been subject of many biostratigraphic, magnetostratigraphic and palaeoclimatic studies in order to define the Plio/Pleistocene boundary, since marine sediments of the sequence contain the "northern guests" *Arctica islandica* (Linnaeus) and *Hyalinea balthica* (Schröter) (Papani & Pelosio, 1963). A regressive Pleistocene phase is recorded in the upper part of the sedimentary succession cropping out along the fluvial tract between S. Nicomede and Laurano villages (Parma) (Bertolani Marchetti et al., 1979; Raffi, 1982; Mary et al., 1993), now comprised in the Stirone Regional Fluvial Park (Emilia-Romagna Region).

Within the Pleistocene succession two main sedimentary cycles can be distinguished: the former, referred to the Early Pleistocene age, was mostly deposited in a coastal marine environment and comprises one continental and two lagoonal episodes; the latter, early Middle Pleistocene in age, is separated by the lower one by an erosive surface, and represented by non-marine deposits yielding continental fauna (vertebrates and molluscs; Pelosio & Raffi, 1977; Raffi, 1982).

In the nineties palaeontological samplings carried out along the fossiliferous Pleistocene succession provided abundant brackish and freshwater molluscan assemblages studied by Monegatti & Pelosio (1994) and Ciangherotti et al. (1997). In the present paper a new extinct freshwater prosobranch species of the genus *Tanousia* Servain, 1881, from the first sedimentary cycle (Early Pleistocene in age), is described.

MATERIALS AND METHODS

Detailed samplings for malacofaunistic analyses have been carried out in sandy and clayey deposits belonging to the continental episode of the first Lower Pleistocene cycle. The fossiliferous sampled deposits yielding rich fresh water molluscan assemblages of prosobranchs, heterobranchs and bivalves, crop out along the Stirone river right bank, between 59.60 m and 65.60 m (= level 10 in Raffi, 1982 and levels "a" and "b" in Ciangherotti et al., 1997) of a measured section (see Bertolani Marchetti et al., 1979), just above the last local occurrence of *Arctica islandica* (Pelosio & Raffi, 1977; Raffi, 1982). The fresh-water interval, made up of alternating sands, silty-sands and thin green clays beds, presents a muddy level with large round pebbles at the base, overlying sandy-silty shallow water marine deposits. A lagoonal interval with typical brackish water molluscan assemblages follows the continental one (Pelosio & Raffi, 1977; Monegatti & Pelosio, 1994). Several specimens of the new gastropod species here described have been recorded from distinct clayey levels of the freshwater interval

ISSN 0375-7633

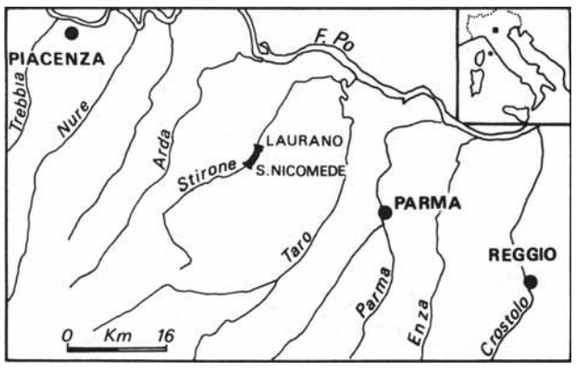


Fig. 1 - Location of the study Stirone River stratigraphical section (from Bertolani Marchetti et al., 1979).

between S. Nicomede and Laurano (Parma province; Fig. 1). Bulk samples of sediments yielded in total more than 1500 specimens of the new species, which was preliminarily labelled as *Tanousia* n. sp. by Ciangherotti et al. (1997).

SYSTEMATICS

Phylum MOLLUSCA Linnaeus, 1758
Class GASTROPODA Cuvier, 1797
Family HYDROBIIDAE F.H. Troschel, 1857
Subfamily LITHOGLYPHINAE F.H Troschel, 1857

Genus *Tanousia* Servain, 1881
(=*Lithoglyphulus* Schlickum & Schütt, 1971)

Type of genus (designated by Schlickum, 1974) - *Limnaea zrmanjae* Brusina, 1866 (= *Lithoglyphulus tedanicus* Schlickum & Schütt, 1971).

Tanousia stironensis n. sp.
Pl. 1, figs. 1-5

1994 *Prososthenia ovata* (Bronn) - MONEGATTI & PELOSIO, p. 199 (*non* Bronn).
1997 *Tanousia* n. sp. - CIANGHEROTTI ET AL., p. 305, Pl. 1, figs. 6a-b.
1997 *Tanousia* n. sp. - GLIOZZI ET AL., p. 378.

Diagnosis - A species of the genus *Tanousia* Servain with shell ovate-conic, elongate, with six barely convex whorls. Apex small, pointed and smooth. Aperture ovate-oblong, oblique, angular on the upper side. Peristome thickened on the columellar side with expanded lip. A columellar callous is present deeply in the aperture. Not umbilicated or with a faint slit-like umbilicus.

Mean size - Shell, H = 4.98 mm; B = 2.47 mm; Aperture, H = 2.45 mm; B = 1.4 mm.

Description - Shell small, solid, ovate-conic, elongate, more or less slender, with six very slightly convex whorls divided by shallow sutures. Last whorl, large, higher than 2/3 of the total height. Apex small, pointed and smooth. Shell surface with very thin, serried growth lines. Aperture ovate-oblong, oblique, angular on the upper side, more or less enlarged on the palatal side. Outer lip sinuated adapically, slightly withdrawn in the lower part. Peristome continuous, thickened adapically and on the columellar side to the inner wall of the aperture; columellar lip expanded and adherent to the last whorl. A more or less prominent callous is present in the middle-lower part of the columella inside the aperture. Not umbilicated or with a faint slit-like umbilicus.

Size range - Shell, H = 4.6-5.5 mm; B = 2.1-3.1 mm; Aperture, H = 2.1-2.7 mm; B = 1.3-1.6 mm.

Type material - Holotype, MPUR-7-3471, level "b", Stirone River sequence, between Laurano and S. Nicomede (Parma, Emilia-Romagna), Early Pleistocene. Paratypes, MPUR-7-0961, 3472, 3473, 3474, level "b".
MPUR-7 = Museo di Paleontologia dell'Università di Roma "La Sapienza", coll. Esu-Girotti.

Additional material - Stirone River sequence, Early Pleistocene. Level "a", 8 adults + 45 apexes, MPUR-7-0950; level "b", 1593 adults + 268 young specimens, MPUR-7-0930-0960-0949-1344.

Type locality - Stirone River, between Laurano and S. Nicomede (Parma, Emilia-Romagna, Northern Italy).

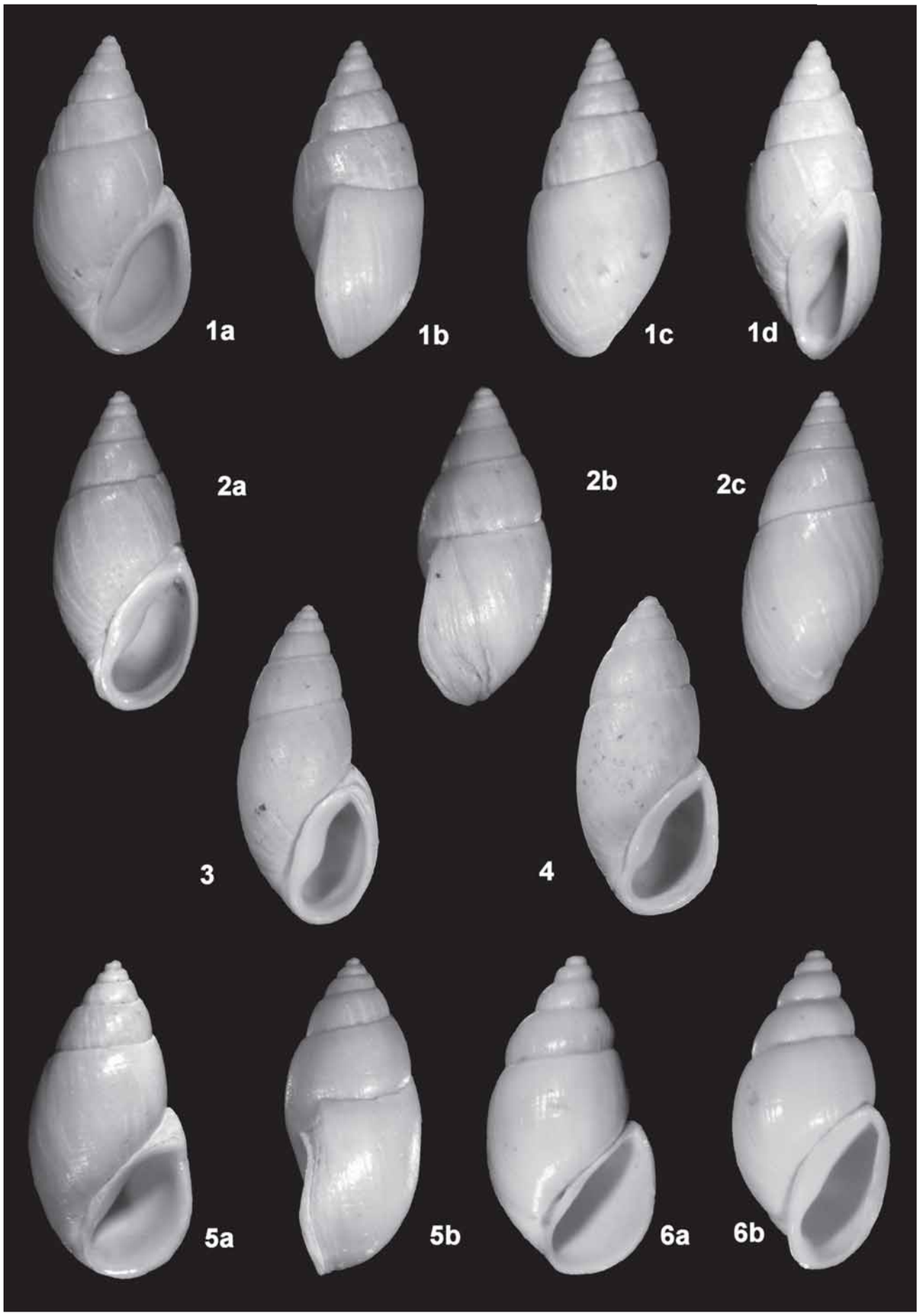
Type level - Lower Pleistocene non-marine silty-clayey layers of the Stirone River sedimentary sequence (Emilia-Romagna).

EXPLANATION OF PLATE 1

figs. 1-5 - *Tanousia stironensis* n. sp., Stirone River sequence (Parma, Emilia-Romagna), Early Pleistocene.
1a-d - Holotype, MPUR-7-3471; x 11.5.
2a-c - Paratype, MPUR-7-0961; x 12.2.
3 - Paratype, MPUR-7-3472; x 12.5.
4 - Paratype, MPUR-7-3473; x 10.9.
5 - Paratype - MPUR-7-3474; x 12.5.

fig. 6 - *Tanousia subovata* (Settepassi), Cona, Castelliri (Frosinone, Latium), Middle Pleistocene.
6a-b - MPUR-7-3475; x 13.3.

All figured specimens are stored in the coll. Esu-Girotti, MPUR.


1a
1b
1c
1d
2a
2b
2c
3
4
5a
5b
6a
6b

Derivation of name - The name of the new species refers to the Stirone river (Emilia-Romagna), along which a well-known and fossiliferous upper Miocene-Pleistocene sedimentary succession of great geological and palaeontological interest crops out.

Stratigraphic and geographic distribution - Early Pleistocene, Emilia-Romagna (Northern Italy).

Comparisons and remarks - The examined specimens show the features characterizing the genus *Tanousia* Servain, 1881, shape and size of the shell, as well as the other morphological characters diagnostic for this genus as redescribed by Schlickum (1974, p. 78): "Shell small, rather solid, more or less ovate-conic to elongate ovate-conic; apex pointed, spire conic to conic elevated; 4-6 whorls proportionately growing, slightly to moderately convex, smooth, but with fine growth lines, separated by a more or less pronounced suture. Last whorl very large, about 3/4 to 5/6 of the shell height, not umbilicated to wide slit-like umbilicus; aperture more or less slightly angulated above, more or less ovate; peristome continuous, not detached, more or less callous on the columellar side to the inner wall of the aperture; free peristome sharp; outer lip more or less slightly withdrawn in the lower part."

Some authors, such as Kabat & Hershler (1993), consider Bourguignat as the author of the genus *Tanousia* (Bourguignat in Servain, 1881) since he first assigned this generic name to four Dalmatian species, even if *in schaedis* (see Servain, 1881, p. 64): *T. zrmanjae* (Brusina, 1866), *T. letourneuxi* (Bourguignat, 1880), *T. marchesettiana* (Letourneux in Bourguignat, 1880) and *T. stossichiana* (Letourneux in Bourguignat, 1880).

Among the species assigned to the genus *Tanousia* by various authors (see Esu & Kotsakis, 1996 and references therein), *Tanousia subovata* (Settepassi, 1965 in Settepassi & Verdel, 1965; here figured in Pl. 1, figs. 6a-b) is the closest one to the new species here described. *T. subovata* is a Middle Pleistocene species widely diffused in the lacustrine deposits of the Liri basin (Latium, central Italy; Settepassi & Verdel, 1965; Carrara et al., 1992; Esu & Kotsakis, 1996) and in some Middle Pleistocene basins of southern Italy (Esu & Pisegna Cerone, in press). The morphological differences between *T. subovata* and *T. stironensis* consist in a smaller shell size of *T. subovata*, in the major convexity of the whorls and a more conical shape, a relatively wider aperture, peristome less thickened, columellar callous less pronounced, a constant presence of a slit-like umbilicus and in the different shell H/B ratio (Tab. 1). The variability of the new species *T. stironensis* consists in a more or less slender shell shape and in the shell height (Figs. 2-3; several distinct peaks of histograms are given by choosing small class intervals); the other morphological shell characters, such as number and convexity of whorls, shape of aperture, columellar thickening, are quite constant (Pl. 1, figs. 1-5).

The attribution of numerous gastropod specimens, collected from the same Lower Pleistocene freshwater interval of the Stirone succession, to the hydrobiid *Prososthenia ovata* (Bronn, 1831) by Monegatti & Pelosio (1994), must be considered erroneous; the attribution to *P. ovata* is probably due to the seeming morphological similarity of the species *P. ovata* from the Italian Plio/Pleistocene of Italy (Esu & Girotti, 1975) with *T. stironensis*. No other records of *P. ovata* have been reported from the Stirone succession.

PALAEOECOLOGICAL REMARKS

The non-marine molluscan assemblages recovered from levels "a" and "b", including *Tanousia stironensis* n. sp., are composed of freshwater prosobranchs and heterobranchs, such as *Theodoxus* aff. *T. danubialis* (Pfeiffer, 1828), *Melanopsis* sp., *Bithynia tentaculata* (Linnaeus, 1758), *Lithoglyphus* aff. *L. jahni* (Urbanski, 1975), *Valvata piscinalis* (Müller, 1774), and one bivalve, *Dreissena polymorpha* (Pallas, 1754), mostly testifying fluviatile conditions characterized by very slowly current

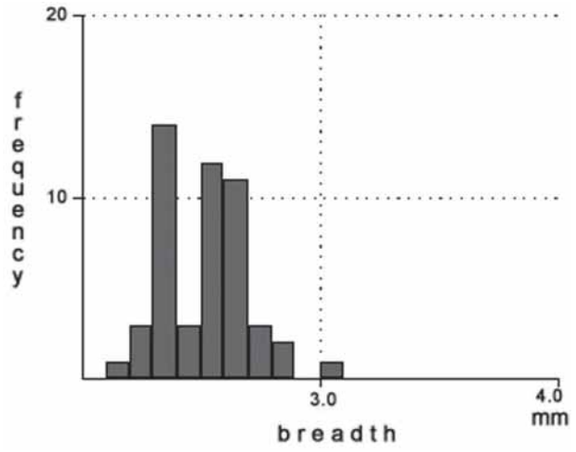


Fig. 2 - Histogram showing frequency of shell breadth measured in 50 specimens of *Tanousia stironensis* n. sp.

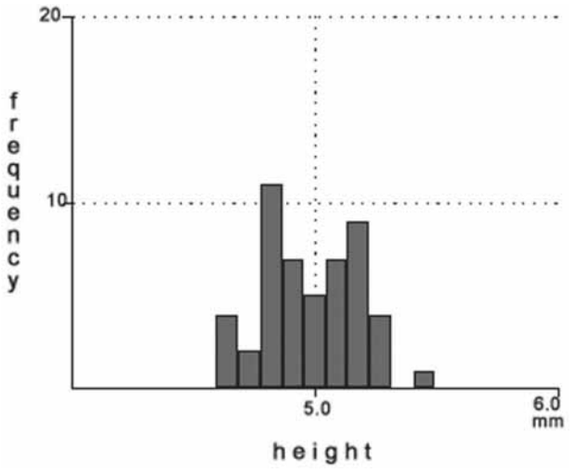


Fig. 3 - Histogram showing frequency of shell height measured in 50 specimens of *Tanousia stironensis* n. sp.

Species	n	whorls	Shell (mm)						
			Height			Breadth			H/B
			m	s.d.	r	m	s.d.	r	m
T. stironensis Strione, lev. b	50	6	4.98	0.21	4.6-5.5	2.47	0.18	2.1-3.1	2.01
T. subovata Lower Liri Valley	15	6	4.23	0.25	3.8-4.6	2.39	0.16	2.2-2.5	1.76
Middle Liri Valley	50	6	4.46	0.29	3.7-5.0	2.48	0.18	2.0-2.6	1.79

Tab. 1 - Measurements of specimens of *T. stironensis* n. sp. (coll. Esu-Girotti, MPUR) and *T. subovata* (Settepassi) (coll. Settepassi, MPUR); m = mean; s.d. = standard deviation; r = range.

water (Ložek, 1964; Ciangherotti et al., 1997). *T. stironensis* is dominant in each of the sampled levels reaching a considerable percentage (up to 89.29%, Ciangherotti et al., 1997). Its inferred ecology, as typical of very slowly streaming water bodies, is deduced by the ecological meaning of the accompanying species. Similarly, the extant representative of the genus *Tanousia*, *T. zrmanjiae*, is found in freshwater fluviatile habitat (Bourguignat, 1880; Radoman, 1983).

The presence of a thermophilous element in the fossil assemblage, such as the genus *Melanopsis*, no more living in the Italian peninsula except for a record in thermal waters of Lago dell'Accesa (Grosseto, Tuscany Maremma; Pantanelli, 1886; Cianfanelli et al., 1989), but occurring at different latitudes in warmer regions, such as Spain, Greece, Africa, is evidence for warmer climatic conditions than present, in accordance with the palaeofloristic and sedimentological interpretations for the same sedimentary interval of the Stirone section. Analyses of the fossil palynoflora from the same deposits have included them in a warm-temperate climatic phase of the Early Pleistocene (Bertolani Marchetti et al., 1979).

In conclusion it is possible to consider *T. stironensis* as a species typical of slow-current freshwater and warm-temperate climate conditions.

ACKNOWLEDGEMENTS

The author is grateful to S. Raffi for his precious guide in the field in 1996. Work supported by the grant of MURST 60% "Molluschi continentali e micromammiferi del Neogene dell'Italia".

REFERENCES

Bertolani Marchetti D., Accorsi C.A., Pelosio G. & Raffi S. (1979). Palynology and stratigraphy of the Plio-Pleistocene sequence of the Stirone river (Northern Italy). *Pollen et Spores*, 21: 149-167.

Bourguignat J.R. (1880). Étude sur les fossiles de la vallée de la Cettina en Dalmatie. 55 pp. D. Bardin, Saint-Germain.

Brusina S. (1866). Contribuzione pella fauna dei molluschi Dalmati. *Verhandlungen der Kaiserlich-königlichen Zoologisch-botanisch Gesellschaft*, 16: 1-134.

Carrara C., Esu D. & Sadori L. (1992). Sedimenti lacustri dell'area di Castelliri (Frosinone, Italia centrale): dati aminostratigrafici, faunistici e palinologici. *Il Quaternario*, 5: 51-60.

Cianfanelli S., Talenti E. & Calcagno M. (1989). Le stazioni di *Melanopsis dufouri* Férussac, 1823 (Gastropoda Prosobranchia) in Italia. *Quaderni del Museo di Storia Naturale di Livorno*, 10: 59-76.

Ciangherotti A.D., Crispino P. & Esu D**.** (1997). Paleoecology of the non-marine molluscs of the Pleistocene Stirone River sequence (Emilia, Northern Italy). *Bollettino della Società Paleontologica Italiana*, 36: 303-310.

Esu D. & Girotti O. (1975). La malacofauna continentale del Plio-Pleistocene dell'Italia centrale. I. Paleontologia. *Geologica Romana*, 13 [1974]: 203-294.

Esu D. & Kotsakis T. (1996). A *Tanousia* from the late Middle Pleistocene of the Italian peninsula (Gastropoda: Prosobranchia: Hydrobiidae). *Archiv für Molluskenkunde*, 125: 105-108.

Esu D. & Pisegna Cerone E. (in press). *Tanousia subovata* (Settepassi) (Hydrobiidae), a Middle Pleistocene correlation element for the central-southern Italian lacustrine basins. *Atti del Museo Civico di Storia Naturale di Trieste*.

Gliozzi E., Abbazzi L., Argenti P., Azzaroli A., Caloi L., Capasso Barbato L., Di Stefano G., Esu D., Ficcarelli G., Girotti O., Kotsakis T., Masini F., Mazza P., Mezzabotta C., Palombo M.R., Petronio C., Rook L., Sala B., Sardella R., Zanalda E. & Torre D. (1997). Biochronology of selected mammals, molluscs and ostracods from the Middle Pliocene to the Late Pleistocene in Italy. The state of the art. *Rivista Italiana di Paleontologia e Stratigrafia*, 103: 369-388.

Kabat A.R. & Hershler R. (1993). The Prosobranch snail family Hydrobiidae (Gastropoda: Rissooidea): Review of classification and supraspecific taxa. *Smithsonian Contributions to Zoology*, 547: 1-94.

Ložek V. (1964). Quartärmollusken der Tschechoslowakei. *Rozpravi Ustredniho Ustavu Geologického*, 31: 7-374.

Mary C., Iaccarino S., Courtillot V., Besse J. & Aissaoui D.M. (1993). Magnetostratigraphy of Pliocene sediments from the Stirone River (Po Valley). *Geophysical Journal International*, 112: 359-380.

Monegatti P. & Pelosio G. (1994). Paleoenvironmental evolution of a Pleistocene lagoon (Stirone River, Emilia, North Italy). *In* Matteucci R., Carboni M.G. & Pignatti J.S. (eds.), Studies on Ecology and Paleoecology of Benthic Communities. *Bollettino della Società Paleontologica Italiana, Special Volume*, 2: 197-202.

Pantanelli D. (1886). *Melanopsis* viventi e fossili d'Italia. *Bullettino della Società Malacologica Italiana*, 12: 65-122.

Papani G. & Pelosio G. (1963). La serie plio-pleistocenica del T. Stirone (Parmense occidentale). *Bollettino della Società Geologica Italiana*, 81: 293-335.

Pelosio G. & Raffi S. (1977). Preliminary remarks on mollusc assemblages of the Stirone river Pleistocene series (Parma Province, Northern Italy). Preprint X INQUA Congress, Birmingham, 19 pp. Institute of Geology, University of Parma.

Radoman P. (1983). Hydrobioidea, a superfamily of Prosobranchia (Gastropoda). I. Systematics. *Monographs of Serbian Academy of Sciences and Arts*, 547: 1-256.

Raffi S. (1982). Stato delle conoscenze sulla sezione pleistocenica marina del Torrente Stirone (Parma). *In* Cremonini G. & Ricci Lucchi F. (eds.), Guida alla geologia del margine appenninico-padano: 141-144, Guida Geologica Regionale S.G.I., Pitagora-Tecroprint, Bologna.

Schlickum, W.R. (1974). Die Gattung *Tanousia* Servain. *Archiv für Molluskenkunde*, 104: 73-79.

Schlickum W.R. & Schütt, H. (1971). *Lithoglyphulus*, eine neue Prosobranchiergattung. *Archiv für Molluskenkunde*, 101: 289-293.

Servain G. (1881). Histoire malacologique du Lac Balaton en Hongrie. 125 pp, S. Le Jay et Cie, Poissy.

Settepassi F. & Verdel U. (1965). Continental Quaternary mollusca of lower Liri Valley (S. Latium). *Geologica Romana*, 4: 369-452.

Manuscript received 18 June 2007
Revised manuscript accepted 11 February 2008