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Article

New Ammonite Genera from the Lower Tithonian (Upper Jurassic) of the Southern Alps (Northern Italy)

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Key words

- homeomorphic Ammonites
- Lower Tithonian
- Trento Plateau
- Northern Italy

Parole chiave

- Ammoniti omeomorfe
- Titoniano inferiore
- Trento Plateau
- Italia Settentrionale

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Summary

New Ammonite Genera from the Lower Tithonian of the Southern Alps (Northern Italy) - four ammonites genera are described from the Lower Tithonian (Upper Jurassic) of Southern Alps (Northern Italy): *Pseudosubplanitoides* n.gen. (top Hybonotum Zone and Albertinum Zone), *Virgatomorphites* n.gen. (Albertinum Zone), *Dorsomorphites* n.gen. (upper Albertinum Zone, Semiforme/Verruciferum Zone and Richteri Zone) and *Pseudopallasiceras* n.gen. (upper Albertinum Zone, Semiforme/Verruciferum Zone, Richteri Zone and basal Biruncinatum Zone). These ammonites show more or less conspicuous resemblance with species from submediterranean and sub-boreal province. Two separate phylogenetic lines can be distinguished within the new homoeomorphic genera: the first from *Virgatomorphites* that represents the ancestor of *Dorsomorphites*. *Dorsomorphites* is moreover closely related to the little younger genus *Blaschkeiceras* Zeiss, 2001 and belong to one single phylogenetic line that evolved during the Early Tithonian in the Mediterranean Province. The second lineage from *Pseudosubplanitoides*, probably derived from *Silicisphinctes* Schweigert & Zeiss, 1999 and the genus *Pseudopallasiceras* that has evolved rapidly from the ancestor *Pseudosubplanitoides.* Macro- and microconchs are tentatively distinguished in the new Genera. The ammonite fauna was collected *in situ* from 12 localities in the "Trento Plateau" (Venetian Aps, Northern Italy), from the Tithonian part of Rosso Ammonitico Veronese Formation.

Riassunto

Nuovi generi di Ammonite del Titoniano inferiore delle Alpi Meridionali (Italia settentrionale) - sono descritti quattro nuovi generi di ammoniti del Titoniano inferiore delle Alpi Meridionali (Nord Italia): *Pseudosubplanitoides* n. gen. (tetto Zona a Hybonotum e Zona ad Albertinum), *Virgatomorphites* n. gen. (Zona ad Albertinum), *Dorsomorphites* n. gen. (parte alta Zona ad Albertinum, Zona a Semiforme/Verruciferum e Zona a Richteri) e *Pseudopallasiceras* n. gen (parte alta Zona ad Albertinum, Zona a Semiforme/Verruciferum, Zona a Richteri e base Zona a Biruncinatum). Questi nuovi generi mostrano convergenze morfologiche più o meno spiccate con specie delle province submediterranea e sub-boreale. Sono state individuate due linee filogenetiche che legano tra loro questi nuovi generi: la prima parte dal genere *Virgatomorphites* dal quale deriva *Dorsomorphites* e che successivamente si evolve nel genere *Blaschkeiceras* Zeiss, 2001. La seconda parte dal genere *Silicisphinctes* Schweigert & Zeiss, 1999 che evolve nel genere *Pseudosubplanitoides* e quest'ultimo nel genere *Pseudopallasiceras.* Nell' insieme costituiscono due distinte linee filogenetiche che si evolvono durante il Titoniano inferiore nella provincia Mediterranea. La fauna è stata raccolta *in situ* in 12 successioni appartenenti al cosiddetto "Trento Plateau" nella porzione titoniana del Rosso Ammonitico Veronese.

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Introduction

four new ammonite genera are established in this paper in the context of a broad study about the systematics and biostratigraphy: "Ammonite fauna, Stratigraphy and Sea level change in the Tithonian of Southern Alps, Northern Italy" (Sarti, monograph in preparation). The rich ammonite fauna described herein was collected *in situ* from 12 localities in the Venetian Aps, Northern Italy, from the Tithonian part of Rosso Ammonitico Veronese Formation (RAV) and from the so called "Diphya-layers", which are the transitional layers to the overlying cretaceous unit "Biancone" (Maiolica - type) pelagic limestones with rare ammonites. The transition occurs gradually, the nodular character is reduce upwards and disappear completely in the "Biancone". The studied sections are located in the: 1- Monte Giovo (Trento); 2- Col Santo (Monte Pasubio, Rovereto); 3- Col Santino (Monte Pasubio, Rovereto); 4- Ex Comando Austro-Ungarico (Virti di Folgaria, Trento); 5- Roccolo (Lavarone, Trento); 6- Monte Rust 1 (Lavarone, Trento); 7- Monte Rust 2 (Lavarone, Trento); 8- Bus De Pissavacca (Lavarone, Trento); 9- Voltascura Quarry (Ghelpach, Asiago, Vicenza); 10- Cortese Quarry (Monte Kaberlaba, Asiago, Vicenza); 11- Colle Oro (Monte Grappa, Belluno); 12- Pergola Quarry (Grezzana, Verona).

The studied fauna comprises several species assigned to the new Early Tithonian genera described below in this paper. The different species of the studied fauna show resemblance with species of *Subplanitoides* Zeiss, 1968 from the submediterranean province (*Pseudosubplanitoides* n. gen.), *Virgatosimoceras* Spath, 1925 from the mediterranean and submediterranean province (*Virgatomorphites* n.gen), *Dorsoplanitoides* Zeiss, 1968 from the submediterranean province (*Dorsomorphites* n. gen.) and *Parapallasiceras* Spath, 1925 from the submediterranean and sub-boreal province (*Pseudopallasiceras* n. gen.). Many authors (Cecca 1990a; Zeiss *et al.* 1994; Scherzinger *et al.* 2010; Fozy & Scherzinger 2013, ecc…) have already pointed out the close morphological similarity of mediterranean and sub-mediterranean ammonites of the *Lithacoceratinae*. Many mediterranean specimens assigned to sub-mediterranean genera show features characteristic for the new genera described below. Stratigraphic and geographic distributions provide independent criteria for the evaluation of homeomorphy: taxa geographically isolated evolved the homeomorphic character-states and later exposed to similar environmental conditions as their homeomorphs as suggested by paleoecological data.

The differentiation of these new Tithonian genera from Northern Italy shows the existence of successive chronospecies demonstrating a well defined lineage through the Early Tithonian Hybonotum, Albertinum (=Darwini), Semiforme/Verruciferum and Fallauxi Zones. This succession of chronospecies, opens the possibility of enhancement of the time-correlation of the Mediterranean Province with adjacent regions. Within the main lineage, two phylogenetic lines can be distinguished among the new genera (Fig. 1):

1. the first lineage from *Virgatomorphites* nov. gen. morphologically related to *Dorsomorphites* nov. gen. (upper Albertinum Zone, Semiforme/Verruciferum Zone and lower-middle part of the Fallauxi Zone). *Virgatomorphites* appears in a stratigraphically deeper level (Albertinum Zone) and in our opinion represents the ancestor of *Dorsomorphites*. The earliest known representative of *Dorsomorphites* show some characters of *Virgatomorphites* and successively evolved showing the very peculiar characteristics of the new genus. *Dorsomorphites* is moreover closely related to the little younger genus *Blaschkeiceras* Zeiss, 2001 and belong to one single phylogenetic line that evolved during the Early Tithonian in the Mediterranean Province. The phenotypic change takes place in a very short stratigraphical interval.
2. the second lineage from *Pseudosubplanitoides* nov.gen. (top Hybonotum Zone and Albertinum Zone), probably derived from *Silicisphinctes* Schweigert & Zeiss, 1999 and the new genus *Pseudopallasiceras* (reported from the successive Semiforme /Verruciferum Zone) that has evolved rapidly from the ancestor *Pseudosubplanitoides.* The most important variable character is represented by the morphological evolution of the shape of ribs from *Silicisphinctes* to *Pseudopallasiceras* via *Pseudosubplanitoides*: within the chronocline the ribbing gradually tend to becomes more and more rigid during phyletic evolution.

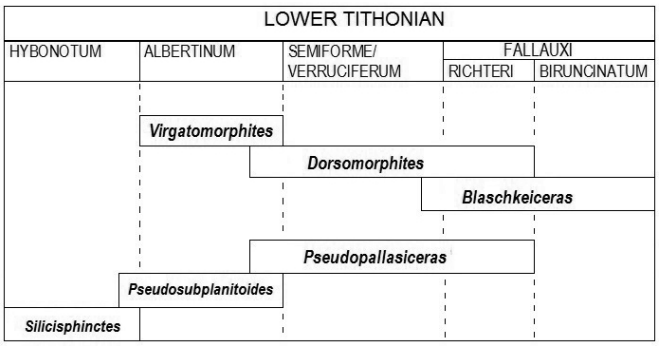

Fig. 1 *- The phylogenetic lineage of the successive four new Genera throughout the lower Tithonian. Zonal names used in this paper follow the zonal scheme of Sarti (1985, 1988a, 1995), Caracuel et al. (1997, 1998) and Sarti (in preparation) / Distribuzione biostratigrafica e filogenesi dei quattro nuovi generi durante il Titoniano inferiore. I nomi delle biozone qui utilizzati derivano dagli schemi biostratigrafici di Sarti (1985, 1986a, 1988a, 1995), Caracuel et al. (1997, 1998) e Sarti (in preparazione).*

Some specimens show morphology and sculpture transitional between two genera and "trans." forms can be observed: *Silicisphinctes* trans. *Pseudosubplanitoides*, *Pseudosubplanitoides* trans. *Pseudopallasiceras*, *Virgatomorphites* trans. *Dorsomorphites*, ecc… (Sarti, in preparation).

Macro- and microconchs are tentatively distinguished in the new Genera; it is possible that these ammonites represent dimorphic pairs (*Pseudosubplanitoides* "m" / *Virgatomorphites* "M" and the somewhat younger *Pseudopallasiceras* "m"/ *Dorsomorphites* "M").

Geological setting

the Rosso Ammonitico Veronese Formation (RAV) is a Venetian Alp carbonate formation of Middle and Late Jurassic age, studied for the first time by Leonardo da Vinci (1505). In the last nineteenth century, studies were made by Catullo (1853), Oppel (1862-63), Zittel (1870) and Neumayr (1873). Biostratigraphic research in the area was made by Clari *et al.* (1990, 1991), Pavia *et al.* (1987), Petti *et al*. (2011), Sarti (1985, 1986a, 1986b, 1988a, 1998b, 1990, 1993, 1994, 1995, 1995a, 1999, 1999a, 2003) and by Caracuel *et al.* (1997, 1998). Sarti described, in the cited papers, the biostratigraphic ranges for ammonites and proposed a new ammonite zonation. Correlations between different biostratigraphic units, and their position within the system of references provided by the standard ammonite scales, have been published by the French Group for Jurassic Studies (1997), see also Caracuel *et al.* (1998). A petrographic and biosedimentological study of the Rosso Ammonitico Veronese has been published by Préat *et al*. (2006). See also Martire et al. (2006) and Lukeneder (2011).

The Tithonian RAV limestones represent depositional regimes with low sedimentary supply, and occur mainly in the region between Lake Garda and Monte Grappa (Southern Alps, Northern Italy). This facies was developed on a distal pelagic-swell system ("Trento Plateau" or "Piattaforma atesina"). This epioceanic plateau was located in the northern part of the Apulian Block, which represented a part of the North Africa continental margin (Caracuel *et al.* 1997, 1998; Sarti 2003; Sarti, in preparation). Among West Tethyan epioceanic fringes, the Trento Plateau was surrounded by basins extending for some

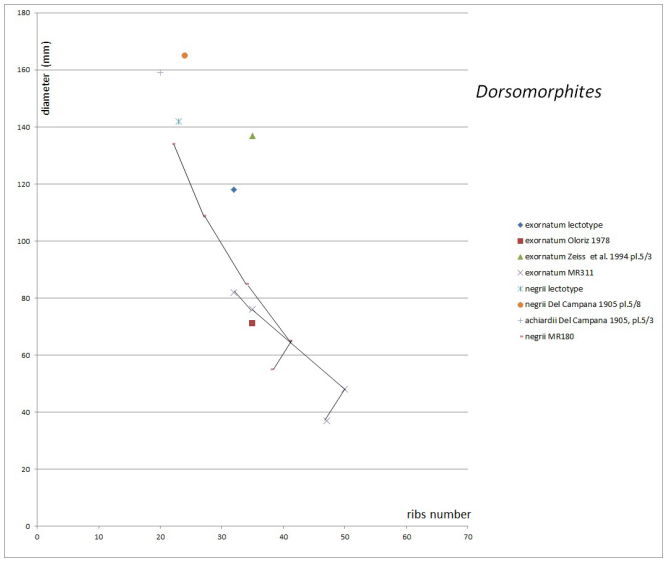

Fig. 2 - Dorsomorphites exornatum *and* Dorsomorphites negrii *described by Catullo (1853) and Del Campana (1905). Rib-density curves compared with the other relevant material discussed in text. Abscissa = Umbilical ribs per whorl. Ordinate = shell diameter /* Dorsomorphites exornatum *e* Dorsomorphites negrii *descritti da Catullo (1853) e Del Campana (1905): densità costale comparata con quella degli esemplari più pertinenti qui trattati. Ascissa = numero di coste ombelicali sull'intera spira. Ordinata = diametro degli esemplari.*

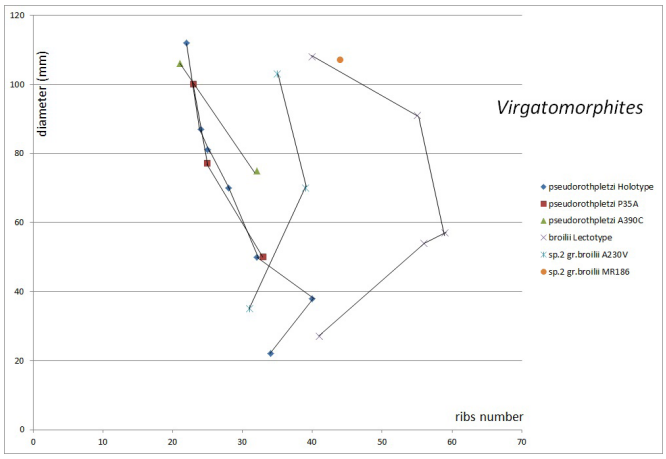

Fig. 4 - Virgatomorphites pseudorothpletzi *and* Virgatomorphites broilii *described by Sarti (this paper) and Schneid (1915). Rib-density curves compared with the other relevant material discussed in text. Abscissa = Umbilical ribs per whorl. Ordinate = shell diameter /* Virgatomorphites pseudorothpletzi e Virgatomorphites broilii *descritti da Sarti (in questo lavoro) e Schneid (1915): densità costale comparata con quella degli esemplari più pertinenti qui trattati. Ascissa = numero di coste ombelicali sull'intera spira. Ordinata = diametro degli esemplari.*

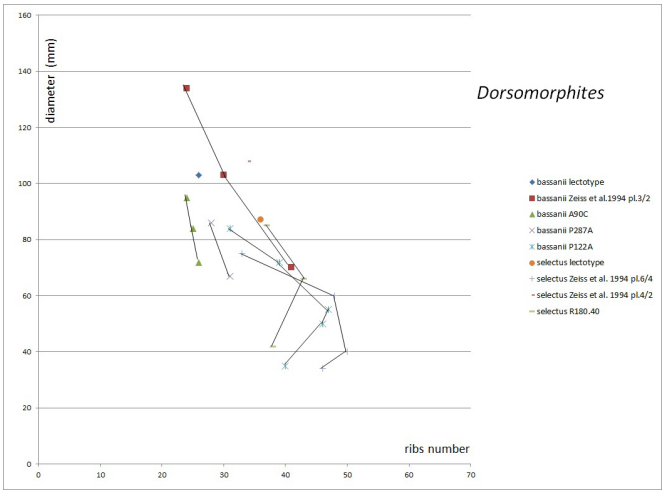

Fig. 3 - Dorsomorphites bassanii *and* Dorsomorphites selectus *described by Del Campana (1905) and Neumayr (1873). Rib-density curves compared with the other relevant material discussed in text. Abscissa = Umbilical ribs per whorl. Ordinate = shell diameter /* Dorsomorphites bassanii *e* Dorsomorphites selectus *descritti da Del Campana (1905) e Neumayr (1873): densità costale comparata con quella degli esemplari più pertinenti qui trattati. Ascissa = numero di coste ombelicali sull'intera spira. Ordinata = diametro degli esemplari.*

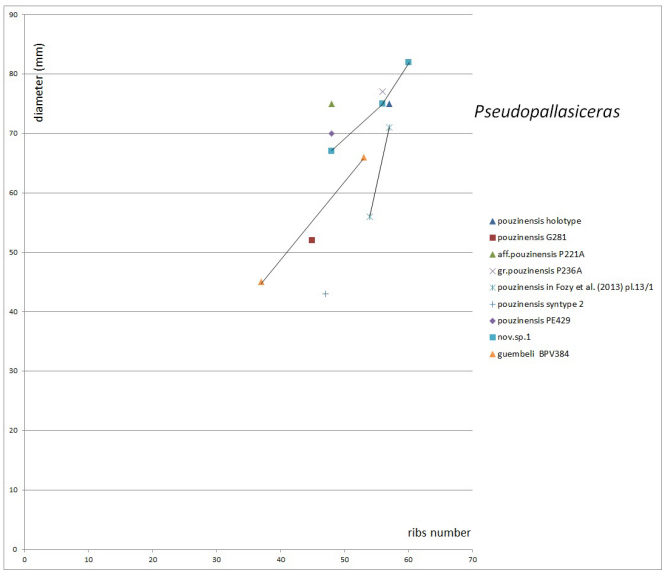

Fig. 5 - *P*seudopallasiceras mediterraneum *and* Pseudopallasiceras toucasi *described by Cecca (1990) and Cecca & Enay (1986). Rib-density curves compared with the other relevant material discussed in text. Abscissa = Umbilical ribs per whorl. Ordinate = shell diameter /* Pseudopallasiceras mediterraneum e Pseudopallasiceras toucasi *descritti da Cecca (1990) e da Cecca & Enay (1986): densità costale comparata con quella degli esemplari più pertinenti qui trattati. Ascissa = numero di coste ombelicali sull'intera spira. Ordinata = diametro degli esemplari.*

hundreds of kilometers, receiving pelagic marls and mudstones with occasional siliceous horizons. This pelagic sea-mount constituted a palaeogeographic unit free from terrigenous inflows and allochthonous carbonates which accumulated in surrounding troughs: the Lombard Basin to the West and the Belluno Trough eastwards.

The RAV Formation is divisible into 3 lithostratigraphic units in succession: the lower unit (Bajocian - Bathonian in age) consisting of massive nodular limestones, the middle unit (from late Callovian to Oxfordian and/or earliest Kimmeridgian in age) mainly consisting of siliceous limestones and marls, and the upper unit (Kimmeridgian - Tithonian in age), which is composed of ammonite-rich nodular marly/calcareous limestones.

The RAV succession in the Trento Plateau has been differentiated into type "A" and "B" successions (Sarti 1985, 1988a, 1993). Between the lower and the upper units, the type "A" succession shows a significant and mineralized hardground in which neomorphic carcasses of ammonites and belemnite rostra (a quasi-belemnite battlefield *sensu* Doyle & MacDonald, 1993) are concentrated. On the other hand, in

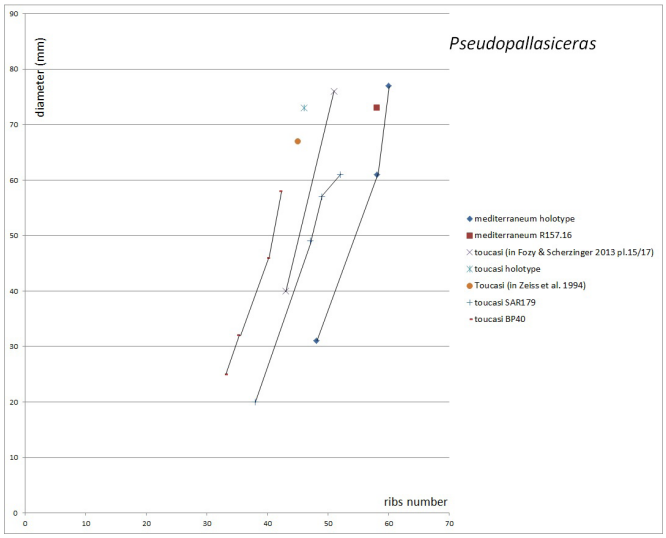

Fig. 6 - Pseudopallasiceras pouzinensis *and* Pseudopallasiceras guembeli *described by Toucas (1890) and Zeiss (1968). Rib-density curves compared with the other relevant material discussed in text. Abscissa = Umbilical ribs per whorl. Ordinate = shell diameter / Pseudopallasiceras pouzinensis e Pseudopallasiceras guembeli descritti da Toucas (1890) e da Zeiss (1968): densità costale comparata con quella degli esemplari più pertinenti qui trattati. Ascissa = numero di coste ombelicali sull'intera spira. Ordinata = diametro degli esemplari.*

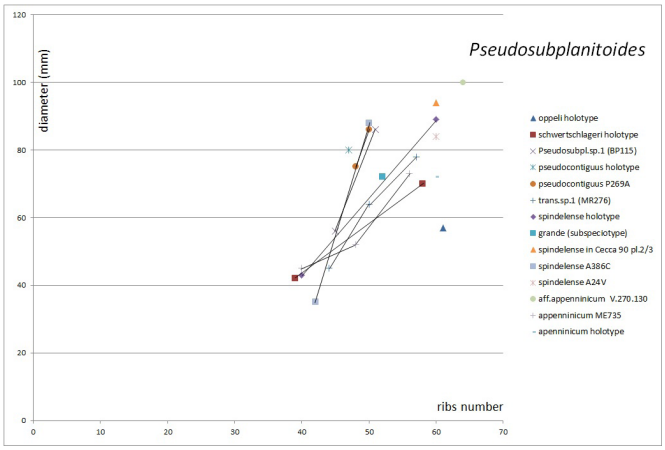

Fig. 7 - *Holotypes of* Pseudosubplanitoides oppeli, Pseudosubplanitoides schwertschlageri, Pseudosubplanitoides pseudocontiguus, Pseudosubplanitoides spindelense *and* spindelense grande, Pseudosubplanitoides apenninicum *described by the authors. Rib-density curves compared with the other relevant material discussed in text. Abscissa = Umbilical ribs per whorl. Ordinate = shell diameter / Olotipi delle specie* Pseudosubplanitoides oppeli, Pseudosubplanitoides schwertschlageri, Pseudosubplanitoides pseudocontiguus, Pseudosubplanitoides spindelense *e* spindelense grande *e* Pseudosubplanitoides apenninicum *descritti dagli AA.: densità costale comparata con quella degli esemplari più pertinenti qui trattati. Ascissa = numero di coste ombelicali sull'intera spira. Ordinata = diametro degli esemplari.*

the type "B" succession, cherty limestones (the Intermediate Unit of the RAV) are intercalated between the massive nodular limestones and the overlying nodular marly/calcareous limestones. Thicknesses in this siliceous deposit varies along the Trento Plateau, locally reaching 10m. At the top of this intermediate unit there is a bentonite-rich horizon (Bernoulli & Peters 1970, 1974). Recently Pellenard *et al*. (2013) focused on the first ^{40}Ar- ^{39}Ar date from these volcanic (bentonites) layers. The thickest bentonite layer, attributed to the Transversarium Zone (middle Oxfordian), yields a precise and reliable ^{40}Ar- ^{39}Ar date of 156.1 ± 0.89 Ma.

The ammonite faunas were collected bed-by-bed in sections along a direction extending from the eastern to the western margins of the Trento Plateau. The strata containing the new genera established in the present paper, were deposited on the submarine Trento Plateau, including Venetia and Trentino (Venetian Alps) during Tithonian times: the 12 sections studied are distributed in a area of about 2500 Km^2 of the Trento Plateau. The eastern (M. Grappa), and western (M. Giovo) sections are the palaeogeographical margins of the plateau, the southern (Grezzana) is the present limit, near the original palaeogeographical margin. Systematic sampling carried out over 30 years have yielded a very rich collection of *in situ* fossils. The very low supply of sediment (the thickness of the Tithonian succession varies from 5 to 12 m) has resulted in precise stratigraphic positioning, with a cm sampling-interval. A 1 cm wide sampling is rarely reported from Ammonitico Rosso facies, and gives the most precise information on the assumption that homotaxial successions are proven for ammonites, as it is our sampling for the present study.

The Trento Plateau area corresponds to a high, comparatively unstable epioceanic bottom, with low and frequently condensed sedimentation. This environment was rich in ammonites (allowing accurate datation) and the tectonic instability was minor. Lacking taphonomic noise and, the differential record among the ammonite groups studied with respect to other (Caracuel *et al.*1997; Sarti 2003), could point to palaeobiological differences in response to environmental fluctuations.

Deposition of nodular-marly (lower energy currents), nodular-calcareous and pseudonodular-calcareous-massive (higher energy currents) Ammonitico Rosso facies were controlled by a combination of productivity and hydrodynamics, related to fluctuations of the relative sea-level. The nodular marly facies (wackestones and occasionally packstones) are well represented in the Herbichi Zone (Uhlandi Subzone), in the Beckeri-Pressulum Zone (Kimmeridgian), and in some intervals in the Hybonotum and Albertinum zones (Lower Tithonian). The nodular calcareous facies (mainly packstones, and some wackestones) are the typical facies, widespread in all sections. The pseudonodular calcareous massive facies (mainly packstones, and some wackestones) are only present at the base of the Hybonotum Zone (Lowermost Tithonian) (Sarti, in preparation).

Systematic paleontology

The author has not intended to give here a monographic description of all the ammonites that have been found. This chapter contains descriptions of the new genera, descriptions of the type species and details of the studied specimens collected by the author belonging to the new genera, with dimensions of the better preserved specimens and synonyms of the species. All dimensions of specimens are given in millimeters. The biochronostratigraphy of the species is indicated. All specimens housed in the Museo di Geologia e Paleontologia "G. Capellini" of the University of Bologna, Italy.

ABBREVIATIONS: D = shell diameter; H = whorl height; W = whorl breadth; U = umbilical diameter. Ratios of parameters measured to shell diameter = H/D, W/D, U/D; UR (UR/2) = Umbilical ribs on last whorl (and per half whorl); Ph = Phragmocone; B.C. = Body Chamber; end Ph. = end of the Phragmocone. K/T = Kimmeridgian / Tithonian boundary. "M" = macroconch; "m" = microconch.

Order *Ammonitida* Fischer, 1882
Suborder *Ammonitina* Fischer, 1882

Superfamily *Perisphinctoidea* Steinmann, 1890
Family *Ataxioceratidae* Buckmann, 1921
Subfamily *Lithacoceratinae* Zeiss, 1968

Tab.1 - Key with the diagnostic elements to differentiate genera among Lower Tithonian Lithacoceratinae of the Trento Plateau - Quadro sinottico con gli elementi diagnostici per differenziare i generi di Lithacoceratinae titoniani del Trento Plateau.

GENUS	ORNAMENTATION OF THE CONCH	RIBS ON THE VENTRAL REGION	SIZE AND WHORL-SECTION
***Dorsomorphites* nov. gen. (M)**	Inner whorls are ribbed with biplicate ribs, in later stages the ribbing becomes polygyrate more or less numerous, more or less prosocline / prorsiradiate, marked by the intercalation of ataxioceratoid-fasciculate ribs. On the last whorls the main ribs tends to thickening and to virgatosimoceratid-like appearance. On the last whorls however, thick and strong bipartite ribs and triplicate ribs also exist. Constrictions strong and oblique.	The ribs cross the venter without interruption, or rarely with a slightly weakening.	Robust macroconch with b.c. = ½ to ¾ of the last whorl. Roundish or depressed whorl-section. The peristome is bordered by a a remarkable swelling.
***Virgatomorphites* nov. gen. (M)**	Specimens show ontogenetic stages with changes of ornamentation after the constrictions. Inner whorls are ribbed with single and biplicate ribs. With increasing shell diameter the ribs are tri-quadrifurcate and the biplicate ribs are not observed. On the body chamber the main ribs during ontogeny are more widely spaced and can be very thick and strong, the secondary ribs tend to fade away and are observable widely spaced, bulging bullaeform single ribs with maximum thickness on the umbilical rim.	On inner whorls ribs cross the venter without interruption. On medium whorls (at the end of the phragmocone) there is a well defined and wide smooth ventral band.	Whorl-section subrectangular - subquadratic to depressed. Venter sub-rounded.
***Danubisphinctes* s.l.**	Inner whorls are ribbed with biplicate ribs. In later stages the ribbing becomes polygyrate, fasciculated and virgatotome, almost straight and not flexuous. Res occur with high frequency.	Venter with groove or somewhat flattened.	On the outer whorls whorl-section is oval or subtrapezoidal, on the inner whorls is subquadratic.
Pseudodiscosphinctes	on the inner and medium whorls ribs mostly bifurcate and some simple intercalated ribs. On the outer whorls ribs bifurcate. At the end of the body chamber triplicate polygyrate ribs or very rarely res occurs. Ribs are slightly prorsiradiate and/or flexuous. Rare constrictions occur.	The ribs cross the venter without interruption.	Whorl-section oval with flat, compressed or slightly arched flanks convergent to the venter.
Pseudosubplanitoides nov. gen. (m)	Differs from *Silicisphinctes* by its more rigid ribbing and from *Pseudopallasiceras* by its more flexuous ribbing. Only the earliest representative of *Pseudosubplanitoides* possess slightly flexuous ribs.	The ribs cross the venter without change.. Only in few species there is a smooth ventral band.	Whorl-section fastigate sub-acute to suboval trapezoidal. The maximum whorl width is always at the umbilical borders. The peristome has lappets.
***Pseudopallasiceras* nov. gen. (m)**	Straight and radial ribbing, similar on the inner whorls to *Danubisphinctes*. Biplicate ribs on the phragmocone, spaced on the inner whorls. Although it resembles *Kutekiceras*, it clearly differs in being much more densely ribbed. Moreover the ribbing is not uniform (in *Kutekiceras* is uniform), but the ribbing is more and more dense throughout the ontogeny. The ribs are mainly biplicate on the B.C. However polygyrate, res and simple ribs rarely occurs on the B.C. The ribs are splitting on the middle or upper third of the flanks (upper third especially on the inner whorls). Constrictions occur, strong and deep.	The ribs cross the venter without change, however a smooth ventral band can be observed, chiefly at a smaller diameter, although not in all specimens.	Small size, evolute. Whorl-section is sub-circolar to subtrapezoidal - oval. On the body chamber whorl-section always higher than wide. It differs from *Kutekiceras* in a more involute coiling.
***Kutekiceras* (m)**	The ribbing is uniform in its overall shell, composed by strong and rigid, radial or seldom slightly prorsiradiate, mainly bifurcate, seldom single ribs. At the end of the body chamber triplicate polygyrate ribs or very rarely res occurs. The angle of bifurcation is rather wide, and the secondary ribs have the same thickness as the primaries, which are splitting from the upper third to the ventro-lateral margin. Rare single ribs are also present.	Ribbing not interrupted on venter.	Small to medium size. B.C. = ½ of the last whorl. The Umblicus is wide. Whorl-section circular on the inner whorls, depressed to rounded on the outer whorl.
***Euvirgalithacoceras* (M) S.S.**, Type species: *Euvirgalithacoceras supremus* (Sutner in Schneid) ***Euvirgalithacoceras* (M) S.L.**, Type species: *Euvirgalithacoceras eystettensis* (Schneid)	Ornamentation on the inner whorls: bifurcate, polygyrate and res; only in few species there is a virgatotome ribbing. Difference with respect to *Herbichiceras* is the more spaced ribs. Ornamentation on the outer whorls: differences with respect to *Herbichiceras* are the more spaced ribs and the more rigid virgatotome ribbing. Absence of a fascipartite stage of ribbing.	The ribs cross the venter without any breaks. Only in few species there is a smooth ventral band.	Whorl-section sub-rectangular or trapezoidal, always higher than wide, with flat or slightly convex flanks. Conch is more involute than *Herbichiceras*.
***Subplanites* s.s. (m)**	Ornamentation on the inner whorls: the ribs are mainly biplicate. Ornamentation on the outer whorls: the ribs are biplicate and triplicate, straight or slightly curved. Res occurs. Constrictions exist.	The ribs cross the venter without any breaks.	Whorl-section suboval, higher than wide
***Lithacoceras* (M)**	Ornamentation on the inner whorls: fine and dense biplicate ribbing. Ornamentation on the outer whorls: Fascipartite ribs that during ontogeny turn into widely spaced single ribs.		Whorl-section oval, higher than wide, with convex flanks. The peristome is smooth.
***Silicisphinctes* (m)**	Ornamentation on the inner whorls: fine and dense biplicate ribbing similar to *Lithacoceras*. Ornamentation on the outer whorls: fine and dense biplicate ribbing typically flexuous. Some secondaries are zig-zag like.	Ribbing not interrupted on venter.	Whorl-section fastigate sub-acute to sub-rectangular, maximum whorl width at the umbilical borders. The peristome has lappets.
Herbichiceras	Ornamentation on the outer whorls: polygyrate, virgatotome and intercalatory ribs. Differs from *Euvirgalithacoceras* in having more numerous ribs. The fascipartite ribbing (visible in some of the species) are stronger in respect to *Lithacoceras*. *Virgataxioceras* Arkell 1953 differs in having more rigid virgatotome ribbing and not curved in comparison to *Herbichiceras*.	Ribbing not interrupted on venter.	Medium to large sized conch. Whorl-section sub-quadratic to depressed, always wider than high, with sub-flattened flanks. Differs from *Euvirgalithacoceras* and *Virgataxioceras* Arkell 1953 in having a more evolute shell.

Fig. 8 *- Whorl section of* Virgatomorphites pseudorothpletzi *nov. sp. (M), specimen A134C-1 (Holotype). Natural size (x1). Albertinum Zone (Cortese Quarry, Asiago, Vicenza, Italy) / Sezione della spira di* Virgatomorphites pseudorothpletzi *nov.sp. (M), esemplare A134C-1 (Holotype) a grandezza naturale (x1). Zona ad Albertinum di Cava Cortese (Asiago,Vicenza).*

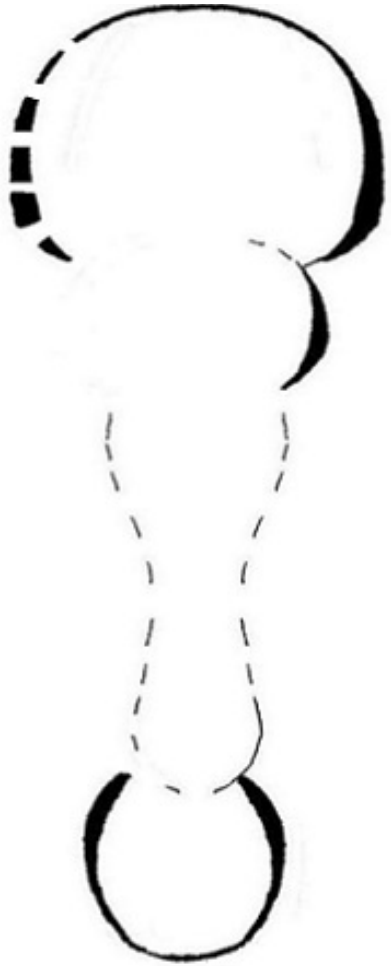

Fig. 9 *- Whorl section of* Dorsomorphites *sp. aff.* negrii *(Del Campana, 1905) (M), specimen MR180. Natural size (x1). Upper part of the Albertinum Zone (M.Rust section, Lavarone, Trento) / Sezione della spira di* Dorsomorphites *sp. aff.* negrii *(Del Campana, 1905). (M), esemplare MR180 a grandezza naturale (x1). Parte alta della Zona ad Albertinum del M.Rust (Lavarone, Trento).*

Dorsomorphites **nov.gen. "M"**

TYPE SPECIES: *Dorsomorphites exornatum* (Catullo, 1853). Holotype, specimen described by Catullo (1853, pl.3, fig. 2a-b) from Malcesine (near Verona, Northern Italy), inventory number Pad.6891-C (refigured herein Pl.1, fig.1A, B, C) housed in the Museo di Geologia e Paleontologia of the University of Padova, Italy.

DERIVATIO NOMINIS: after the similarity of shell morphology, with *Dorsoplanitoides* from submediterranean regions.

DIAGNOSIS: medium to large sized robust macroconch ammonites (Dmax = 165 mm. However, large fragments of bodychambers suggest sizes larger than 200 mm in diameter). Body chamber occupies half to ¾ of the last whorl. Rounded or depressed whorl-section. Ornamentation varies through ontogeny and different stages can be recognized: inner whorls are ribbed with biplicate ribs, in later stages the ribbing becomes polygyrate more or less dense and prosocline-prorsiradiate, marked by the intercalation of ataxioceratoid-fasciculate ribs. On the outer whorls the primary ribs tend to thicken and can be strong, giving a virgatosimoceratid appearance; however, thick strong bipartite and triplicate ribs also exist. The ribs cross the venter without interruption, or rarely with a slight weakening. The peristome is bordered by a remarkable swelling. Constrictions strong and oblique.

SPECIES INCLUDED: *Dorsomorphites exornatum* (Catullo 1853), *Dorsomorphites negrii* (Del Campana 1905 = *Perisphinctes achiardii* Del Campana, 1905), *Dorsomorphites* sp. aff. *negrii* (Del Campana 1905 in Sarti, this paper), *Dorsomorphites bassanii* (Del Campana 1905), *Dorsomorphites selectus* (Neumayr, 1873), *Dorsomorphites* sp. gr. *selectus* (Neumayr 1873 in Sarti, this paper), represent the new genus in the Trento Plateau.

REMARKS AND COMPARISONS - *Dorsoplanitoides* and *Danubisphinctes* are two submediterranean genera established by Zeiss (1968) from the lower Tithonian (Ciliata and Palmatus Zone) of Franconia (Germany). A homeomorph group including "*Pseudokatroliceras*" (Olóriz 1978), *Dorsoplanitoides* (Olóriz 1978), *Dorsoplanitoides* (?) (Zeiss, Benetti, Pezzoni 1994; non Zeiss 1968; non Scherzinger & Schweigert 2003), *Danubisphinctes* or "*Danubisphinctes*" (Olóriz 1978a, pars; Sarti 1986; Cecca 1990a; Cecca & Enay 1991; Zeiss *et al*. 1994; Scherzinger *et al*. 2010, Fozy & Scherzinger 2013), *Dorsoplanitoides* (Sarti 1988), *Pseudokatroliceras* (Sarti 1988) developed in the Mediterranean Province during the Albertinum and Semiforme/Verruciferum Zones. This group (*Dorsoplanitoides* s.l., *"Danubisphinctes"*p.p. and *Pseudokatroliceras* p.p.) is composed of macroconchiate forms chiefly from the Semiforme/Verruciferum Zone. In the Trento Plateau only a single specimen (*Dorsomorphites* aff. *negrii*) was collected from the Albertinum Zone. The new generic name for the group of these homeomorph ammonites is *Dorsomorphites* nov. gen., composed of Mediterranean "*Dorsoplanitoides*", and most part of species assigned to "*Danubisphinctes*" and "*Pseudokatroliceras*". Several specimens assigned to *Pseudokatroliceras* by Oloriz (1978) should belong to the new genus. These ammonites have a similar ontogeny. They can be distinguished only by the different diameter and the more strong ornamentation, however there are

morphological transitions in shell size and ornamentation, but this is interpreted as intraspecific variation.

The Genus *Blaschkeiceras* "M" introduced by Zeiss (2001) together with *Kutekiceras* as the microconch of this genus, differs from *Dorsomorphites* n. gen. in its much less thicker ornamentation and in its higher rib density. However, *Dorsomorphites* n. gen. is closely related to the younger genus *Blaschkeiceras,* belong to a single phylogenetic line that evolved during the Early Tithonian in the Mediterranean Province.

Dorsomorphites nov. gen. differs from *Virgatomorphites* nov. gen. (see below) by its bifurcate ribs persisting into the latest ontogenetic stages, although the aspect of ribbing is very coarse, unlike in the species of *Virgatomorphites* nov.gen. where at start of a certain diameter do not show this character, but the genus *Dorsomorphites* n. gen. in the lowermost Semiforme Zone differs from the *Dorsomorphites* from higher stratigraphic levels in possessing ribs thicker on the lower third of the flanks. Thus, *Virgatomorphites* n. gen. probably represents the ancestor of *Dorsomorphites* n. gen. and these intermediate forms mark the transition.

BIOCHRONOSTRATIGRAPHY: *Dorsomorphites* nov. gen. occurs in the Semiforme/Verruciferum Zone and lower-middle part of the Fallauxi Zone in the Trento Plateau sections (Southern Alps, Italy); only a single specimen (*D.* sp. aff. *negri*) was collected from the upper part of the Albertinum Zone.

Dorsomorphites exornatum (Catullo, 1853)
Pl.1, fig. 1A, B, C; Pl.2, fig.3; text-fig.2

1853 *ammonites exornatum* Catullo, p. 28, tav.3, fig.2a-b
pars 1978 *"Pseudokatroliceras"*- Oloriz, p.651, pl..46, fig.2
1994 *Danubisphinctes* n. sp. 1 - Zeiss, Benetti, Pezzoni, p. 372, pl.5, fig. 3

MATERIAL: three specimens from Monte Rust section (Lavarone, Trento) and Cortese Quarry section (Asiago, Vicenza) with inventory numbers MR311, A435C-1, A436C-1

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
Holotype	118	0.55	0.262	0.237?	32 (13)	end Ph.
"	80	0.518	0.25	-	-	Ph.
Oloriz, 1978 pl.46/2	71	0.502	0.295	0.33	35 (15)	?
Zeiss *et al.*1994 pl.5/3	137	0.49	0.31	0.36	?35 (12)	B.C.
MR311	82.5?	0.521	0.266	-	32 (14)	B.C.
"	76.4	0.523	0.274	0.353	35 (15)	B.C.
A435C-1	136.5	0.556	0.278	0.249	- (12)	B.C.
A436C-1	110	0.518	0.254	-	- (13)	B.C.
"	86	0.526	0.279	0.279	-	B.C.
"	66.2	0.498	0.271	-	-	Ph.

DESCRIPTION - the holotype (by monotypy) is a macroconch. The umbilicus is wide, the last whorl of the phragmocone is compressed with high suboval whorl section. The ventral region is rounded and rather narrow. The ornamentation is composed by strong primary ribs, straight in all ontogenetic stages, which bifurcate in secondaries which cross unchanged the venter. The primaries become progressively more widely spaced throughout the ontogeny, at the same time the furcation point moves from the upper to the inner third of flank. On the outher whorl the ribbing becomes tri- to quadrifurcate, polygyrate and ataxioceratoid-fasciculate, and the furcation point of the ribs is situated from the inner third to the middle of the whorl height. The bifurcation point in the inner whorls is placed at 2/3 of the whorl height and the secondary ribs are mostly covered by the next whorl. There are two constrictions, with similar shape of ribbing, on the last whorl.

Specimens A435C-1 and A436C-1 are macroconchs and show the typical ornamentation of the new genus, with polygyate and ataxioceratoid-fasciculate ribs. Specimen MR311 is probably a complete juvenile, with B.C. = 3/4 of the last whorl. The primaries are rather straight and trifurcate on the middle of the flank; they become progressively more widely spaced throughout the ontogeny. Inner whorls with bifurcates and trifurcates from the upper third of the flank, covered by the last whorl. Two constrictions per each whorl occur.

Fig. 10 *- Whorl section of* Pseudosubplanitoides *sp. (m), specimen MR276. Natural size (x1). Top Hybonotum Zone (M.Rust section, Lavarone, TN) / sezione della spira di* Pseudosubplanitoides *sp. (m), esemplare MR276 a grandezza naturale (x1). Tetto della Zona a Hybonotum del M.Rust (Lavarone , Trento).*

Fig. 11 *- Whorl section of* Pseudosubplanitoides spindelense *(Zeiss, 1968) (m), specimen A386C-3. Natural size (x1). Middle Albertinum Zone (Cortese Quarry section, Asiago) / sezione della spira di* Pseudosubplanitoides spindelense *(Zeiss, 1968) (m), esemplare A386C-3 a grandezza naturale (x1). Parte media della Z. ad Albertinum di Cava Cortese (Asiago, Vicenza).*

Fig. 12 *- Whorl section of* Pseudopallasiceras mediterraneum *(Cecca, 1990) (m), specimen R157.16. Natural size (x1). Lower part of the Semiforme / Verruciferum Zone (just above the acme of* Haploceras verruciferum *within the investigated area) (Roccolo section, Lavarone, TN) / Sezione della spira di* Pseudopallasiceras mediterraneum *(Cecca, 1990) (m), esemplare R157.16 a grandezza naturale (x1). Parte inferiore della Zona a Semiforme / Verruciferum, poco sopra l'acme dell'indice zonale* Haploceras verruciferum *sul "Trento Plateau" (Roccolo di Lavarone, TN).*

REMARKS: Zeiss *et al*. (1994) figured a *Danubisphinctes* "new species 1" herein considered synonym of *D. exornatum*, considering the narrower umbilicus and the higher whorl section, in comparison to the holotype, as intraspecific variability. Differences with respect to *D. bassanii*: see below.

BIOCHRONOSTRATIGRAPHY: *D. exornatum* belongs to the lower (just above the acme of *Haploceras verruciferum* within the investigated area) and middle part of the Semiforme / Verruciferum Zone in the Trento Plateau sections (Southern Alps, Italy). The specimen figured by Zeiss *et al.* (1994) was collected from a layer assigned to the upper part of the Semiforme/ Verruciferum Zone.

Dorsomorphites* aff. *negrii (Del Campana, 1905)
Pl.3, fig.1A, B; text-figs.2, 9

aff. 1905 *Perisphinctes negrii* Del Campana, p.94, tav.5, fig.8; tav.7, fig.3
aff. 1905 *Perisphinctes achiardii* Del Campana, p.93, tav.5, fig.3

MATERIAL: one specimen from M.Rust (Lavarone, Trento) with inventory number MR180

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
Lectotype Del Campana 1905 pl.7/3	142	0.461	0.316	0.292	23 (13)	B.C.
Del Campana 1905 pl.5/8	165	0.545	0.260	-	24 (11)	B.C.
Lectotype *achiardii* Del Campana 1905 pl.5/3	159	0.553	0.251	-	20 (10)	B.C.
MR180	134	0.540	0.246	0.313	22 (9)	B.C.
"	109	0.541	0.256	0.256	27 (12)	End ph.
"	85	0.529	0.270	-	34 (16)	Ph.

BIOCHRONOSTRATIGRAPHY: the specimen was found in a bed assigned to the upper part of the Albertinum Zone. Geyssant (1975) listed *Virgatosimoceras achiardii* from the Semiforme Zone of southern Spain, but unfortunately the material was not figured.

Dorsomorphites bassanii (Del Campana,1905)
Pl.2, fig.1; fig.2A, B; text-fig.3

1905 *Perisphinctes bassanii* sp. n. - Del Campana, p. 72, Tav. 4, fig. 5.
1994 *Dorsoplanitoides* (?) sp.aff. *bassanii* (Del Campana) - Zeiss, Benetti, Pezzoni, p 373, pl.3, fig.2
aff.2013 "*Danubisphinctes*" cf. *bassanii* (Del Campana, 1905) - Főzy & Scherzinger, p.231, pl.10, fig. 2-3, pl.11, fig. 3- 4
pars 2013 "*Danubisphinctes"* sp. 1 - Főzy & Scherzinger, p.232

MATERIAL: five specimens from Cava Cortese (Asiago, Vicenza) and Mount Pasubio (Rovereto) with inventory numbers A90C-2, P278A (cf.-specimen), P36A (cf.-specimen), P287A (aff.), P122A

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
Lectotype Del Campana 1905, pl.4/5	103	0.56	0.25	> 0.29	26 (11)	B.C.
Zeiss *et al*.1994 pl.3/2	134	0.48	0.29	0.30	23-24(11)	B.C.
A90C-2	95	0.536	0.263	0.296	24(11)	B.C.
"	88.6	0.53	0.265	-		
"	84	0.514	0.273	0.309	24 (11)	B.C.
"	72	0.526	0.263	0.308	26? (13)	End ph.
P36A	99.6	0.532	0.257	0.27 ?	- (10)	B.C.
"	55.2	0.524	0.244	-		ph.
P287A	85.7	0.536	0.256	0.291	28 (11)	B.C.
"	67.1	0.521	0.283	0.34 ?	32? (14)	End ph.
P122A	84	0.50	0.273	-	31 (13)	B.C.
"	72	0.493	0.298	0.347	39 (16)	B.C.
"	62.7	0.462	0.303	0.366	- (19)	B.C.
"	47	0.457	0.297	0.361	- (25)	ph.

REMARKS: Főzy & Scherzinger (2013) noted that the Gerecse (Hungary) specimens referred as *D. bassaniii,* fit very well the ammonite figured by Del Campana (1905) from northern Italy. Although the species name "*bassanii*" seems appropriate for these Mediterranean ammonites, Főzy & Scherzinger (2013) reserved the name *bassanii* for the form occurring mainly in the Fallauxi Zone. It is also acknowledged that these ammonites are hard to distinguish from those appearing in the Semiforme Zone, that Főzy & Scherzinger (2013) referred as "*Danubisphinctes"* sp. 1. In comparison to *D. exornatum* and other species of *Dorsomorphites*, *Dorsomorphites bassanii* is characterized by: 1) the much higher bifurcation point of the ribs on internal whors and on body chamber, situated at 2/3 of the whorl height or at the ventro-lateral margin, never lower, 2) the whorl-section always wider than high, 3) a reduced number of main ribs on the outer half whorl (frequently the number is 10-11, in every cases their number may vary from 10 to maximum 13). For this reason the species *D. bassanii* described by Fozy & Scherzinger (2013) is treated herein as "*D. aff.bassanii*". In fact the specimen of Fozy & Scherzinger differs from *D. bassanii* in possessing these characters, mostly a higher number of primary ribs at similar size. It is probably a somewhat younger chronospecies.

BIOCHRONOSTRATIGRAPHY: The specimens figured by Zeiss et al. (1994) were collected from layers assigned to the Semiforme/Verruciferum Zone of the Lessinian Alps (Verona). The "Trento Plateau" specimens are collected from lower Semiforme/Verruciferum Zone (Asiago), Semiforme/Verruciferum Zone and lower-middle part of the Fallauxi Zone (Col Santino, Mt.Pasubio).

Dorsomorphites selectus (Neumayr, 1873)
Pl.2, fig.4A, B; text-fig.3

1873 *Perisphinctes selectus* nov.sp. Neumayr, p.183, pl.34, fig. 3a-b
1986 "*Pseudokatroliceras*" sp.aff. *selectum* (Neumayr) 1873 - Sarti, p.502, tav.4, fig. 2a-b
1994 *Danubisphinctes* n. sp.2 - Zeiss *et al*., p.372, pl.4, fig. 2, pl.6, fig. 2,4

MATERIAL: one specimen from Roccolo (Lavarone, Trento) with inventory number R180.40

SPECIMEN	**D**	**U/D**	**H/D**	**W/D**	**UR (UR/2)**	**Part**
Lectotype Neumayr	87	0.52	0.28	-	36 (17)	B.C.
Zeiss *et al*. Pl.6/4	75	0.50	0.28	0.37	33 (14)	B.C.
Zeiss *et al*. Pl. 4/2	108	0.55	0.26	0.31	34 (14)	B.C.
R180.40	84.6	0.524	0.283	0.319	37 (16)	B.C. or end Ph
"	66.2	0.539	0.256	0.287	43 (21)	Ph

BIOCHRONOSTRATIGRAPHY: the specimens figured by Zeiss *et al*. (1994) were collected from beds assigned to the middle and upper parts of the Semiforme / Verruciferum Zone of the Lessinian Alps (Verona). The specimen R180.40 was found in a bed assigned to the basal Semiforme/Verruciferum Zone.

Dorsomorphites* gr. *selectus (Neumayr, 1873)

MATERIAL: one specimen from Cava Cortese (Asiago, Vicenza) with inventory number A65C-1

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
A65C-1	102.2	0.469	0.313	0.283	- (18)	B.C.
"	83.4	0.473	0.305	0.335	- (21)	B.C.

BIOCHRONOSTRATIGRAPHY: the specimen was found in a bed assigned to the middle part of the Semiforme/Verruciferum Zone.

***Dorsomorphites*? sp**.

MATERIAL: two specimens from Ex Comando Austriaco (CA382) and Bus de Pissavacca (BP387) sections which resemble *Dorsomorphites* n. gen. but also reminiscent of the Ataxioceratinae.

BIOCHRONOSTRATIGRAPHY: the specimens belongs to the lower part of the Semiforme/Verruciferum Zone, just underlying the acme of *Haploceras verruciferum* within the investigated area (CA382) and in the *Haploceras verruciferum* acme horizon (BP387) in the lower Semiforme / Verruciferum Zone in the Trento Plateau sections.

***Virgatomorphites* nov.gen. "M"**

TYPE SPECIES: *Virgatomorphites pseudorothpletzi* nov sp. from Asiago (near Vicenza, Northern Italy).

DERIVATIO NOMINIS: after the shell morphology, homeomorphic of *Virgatosimoceras*.

DIAGNOSIS: Medium to large size macroconchs (diameter about 90 to 150 mm). Length of body chamber approximately a half of the last whorl. Whorl section subrectangular-subquadratic to depressed with subrounded venter. Ornamentation composed of slightly prorsiradiate primary and secondary ribs. Constrictions occur. Three ornamental ontogenetic stages bounded by constrictions. On inner whorls simple and bifurcate ribs cross the venter without interruption. On medium whorls (up to the end of the phragmocone) a well defined, wide smooth ventral band. From about 50 mm in diameter the ribs are tri- to quadrifurcate with no bifurcations. On the body chamber primary ribs are more widely spaced and can be very thick and strong, whereas the secondaries tend to fade away, widely spaced, bulging bullaeform single ribs with maximum thickness on the umbilical margin.

SPECIES INCLUDED: *Virgatomorphites pseudorothpletzi* nov. sp., *Virgatomorphites* gr. *pseudorothpletzi* nov.sp., *Virgatomorphites* sp. 1 gr. *pseudorothpletzi* nov.sp., *Virgatomorphites broilii* (Schneid, 1915), *Virgatomorphites* sp. 2 gr. *broilii* (Schneid, 1915 in Sarti, this paper), represent the genus in the Trento Plateau.

REMARKS AND COMPARISON: Scherzinger *et al*. (2010) pointed out that some ammonites from the lower Tithonian in literature show more or less conspicuous resemblance with species of *Virgatosimoceras*, but that they are actually perisphinctids phylogenetically unrelated with *Virgatosimoceras. Virgatomorphites* nov. gen. includes part of these ammonites. The most important of these species are described by Scherzinger *et al*. (2010, pag. 207-208).

The ornamentation varies through ontogeny and three different stages can be recognized: important characteristic of this new genus is the fact that in every case the ornamental change occurs after a constriction. In the inner whorls the ribs cross the flattish venter without interruption, or with a slightly weakening; In the subsequent ontogenetic stage, after a constriction at the end of the phragmocone, the ribs fade on the ventro-lateral margin, and consequently there is a well defined and wide smooth ventral band. After the last constriction, stage 3 follows with primary ribs thicken and with wider interspaces, the furcation point is difficult to identify because the secondary ribs tend to fade away and furcate ribs turn into widely spaced, bulging bullaeform single ribs with maximum thickness on the umbilical margin. The new genus *Virgatomorphites* is morphologically related to *Dorsomorphites* nov.gen., but appears in a stratigraphically deeper level and in our opinion represents the ancestor of *Dorsomorphites* n. gen. The earliest known representative of *Dorsomorphites* n. gen. actually shows some characters of *Virgatomorphites* and later showing the characteristics of the new genus. The phenotypic change takes place in a very short stratigraphical interval. The new genus differs from *Usseliceras* and *Franconites* in having more evolute shells, and this character looks similar to the genus *Dorsomorphites* nov.gen., but in *Dorsomorphites* bipartite and triplicate ribs remain on the outer whorl, allowing an easy distinction from *Virgatomorphites n.gen. Danubisphinctes* and *Isterites* differ by its more rigid ribbing and a different ribbing style which, similarly to *Dorsomorphites*, tend to not display the vanishing of the ribs on the body chamber. Moreover, on the inner whorls, *Danubisphinctes* differs by having less thickened ribs and *Isterites* is much more involute with respect to *Virgatomorphites* n. gen.

BIOCHRONOSTRATIGRAPHY: all the records of *Virgatomorphites* nov.gen. come from the Albertinum Zone at Asiago near Vicenza, Pasubio Mt. near Rovereto, and Lavarone near Trento sections (Southern Alps, Italy).

***Virgatomorphites pseudorothpletzi* nov sp.**
Pl.4, fig.1; fig.2A, B; fig.3; text-figs.4, 8

HOLOTYPE: the specimen A134C-1 housed in the Museo di Geologia e Paleontologia "Giovanni Capelllini", University of Bologna (Italy).

LOCUS TYPICUS: Cortese Quarry, near Asiago (Provincia di Vicenza, Italy).

STRATUM TYPICUM: Rosso Ammonitico Veronese Formation, upper unit, 220 cm above the K/T boundary.

DERIVATIO NOMINIS: after the similarity with *Virgatosimoceras rothpletzi*.

BIOCHRONOSTRATIGRAPHY: the holotype comes from the Albertinum Zone, lower Tithonian.

MATERIAL: A134C-1, A390C-3, P34A (cf.-specimen), P35A

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
A134C-1	111.5	0.531	0.237	-	22 (11)	B.C.
"	87	0.517	0.275	-	24 (13)	B.C.
"	81	0.52	0.28	-	25 (13)	End ph.
P35A	100.5	0.51	0.253	-	23 (12)	B.C.
"	77	0.50	0.29	-	25? (13)	End ph.
P34A (cf.)	c.130	-	-	-	- (9)	B.C.
A390C-3	106	0.53	0.236	-	21 (10)	B.C.
"	81	0.518	0.283	0.283	? (13)	End ph..

DESCRIPTION: the holotype (A134C -1) is a well preserved specimen. The length of its body chamber is a little more than half a whorl. The whorls have subrectangular section and rather flat flanks and sub-rounded venter. There are three prosocline and rather deep constrictions on the last whorl. The ornamentation is composed of slightly prorsiradiate main and secondary ribs. Thick and strong primary ribs can be observed on both the inner and the outer whorls, and the ribs on the lower third of the flank can be considered real bullae. In the innermost whorls the ribs are simple or bifurcate high on the flank, so that the secondaries are mostly covered by the following whorl. With increasing shell diameter (about 50 mm) the ribs trifurcate or quadrifurcate at around one third to mid-flank. On the outer whorls the ribs are tri- or quadrifurcate on the lower third of the flanks, arising from bullaeform primaries. The ornamentation abruptly changes after every constrictions: on inner whorls ribs cross the venter without interruption, or with a slight weakening; in the subsequent ontogenetic stage, after the second constriction at the end of the phragmocone, the ribs fade on the ventro-lateral margin, and the venter is consequently nearly smooth. After the last constriction, stage 3 follows with main ribs thickened and with larger interspaces, the furcation point is difficult to identify because the poorly distinguishable secondary ribs and furcate ribs turn into widely spaced, bulging bullae-like single ribs (*Lithacoceras*-like style) in which persist the maximum thickness on the umbilical margin up to close the peristome. The venter is smooth also in this stage. Specimen P35A is very similar: the length of the body chamber is a little less than a half whorl, but the specimen is incomplete. The whorls have sub-rectangular section on the outer whorl, tending to subquadratic on the inner whorls. There are three prosocline and rather deep constrictions on the last whorl. The ribbing is composed of slightly prorsiradiate main and secondary ribs, mostly arched forwardly over the venter. Thick and strong primary ribs can be observed on both the inner and the outer whorls, and the ribs on the lower third of the flanks can be considered bullae. In the innermost whorls the ribs are simple or bifurcate high on the flank, but the secondary ribs are mostly covered by the following whorl. On the outer whorls the ribs are tri- to quadrifurcate on the lower third of the flank, arising from the bullaeform main rib. The ornamentation changes abruptly after every constriction: on inner whorls ribs cross the venter without interruption, or with a slightly weakening; in the subsequent ontogenetic phase, after the second constriction at the end of the phragmocone, the ribs fade on the ventro-lateral margin, and the venter is consequently nearly smooth. After the last constriction the main ribs thickened with larger interspaces. Unfortunately the whorl is rather imperfectly preserved at this stage so that it is not possible a further morphological observation.

REMARKS: A390C-3, P35A and P34A are very similar to the holotype. The specimen A390C-3 slightly differs from the other specimens by having weaker bullae. Only *V. broilii* (Schneid) shows some similarities to *pseudorothpletzi*, but V. *broilii* can be easily distinguished by its higher rib density, the ribs mainly bifurcated, and the absence of a stage with bullaeform ribs.

BIOCHRONOSTRATIGRAPHY: the new species come from the lower and middle part of the Albertinum Zone at Cortese quarry (Asiago near Vicenza, Southern Alps, Italy) and middle part of the Albertinum Zone at Col Santino (Mt. Pasubio near Rovereto, Southern Alps, Italy).

***Virgatomorphites* cf. *pseudorothpletzi* nov.sp.**

MATERIAL: a single specimen (P37A) of the Col Santino section (Mt. Pasubio).

BIOCHRONOSTRATIGRAPHY: lower Albertinum Zone.

***Virgatomorphites* sp.1 gr. *pseudorothpletzi* nov.sp.**

MATERIAL: a single specimen (P60A) of the Col Santino section (Mt. Pasubio).

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
P60A	83	?0.54	0.228	0.30	-	B.C.

BIOCHRONOSTRATIGRAPHY: middle Albertinum Zone.

***Virgatomorphites* sp.2 gr. *broilii* (Schneid, 1915)**
Pl.5, fig.1A, B; text-fig.4

gr. 1915 *Simoceras Broilii* n. sp. - Schneid, p. 90 (392), pl. 7, fig. 1 (NON pl. 6, fig. 4 = *Virgatosimoceras rothpletzi*)
? 2013 "*Simoceras* " aff. *broilii* Schneid - Fozy & Scherzinger, p. 238

MATERIAL: Two specimens (A230V, MR186)

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
Lectotype *V. broilii*	108	0.546	0.25	0.203	40 (16)	B.C.
A230V	103	0.501	0.279	0.291	35 (16)	B.C.
"	100.3	0.465	0.284	0.284	35 (16)	end ph..
MR186	107	0.495	0.289	0.205	44 (18)	B.C.

BIOCHRONOSTRATIGRAPHY: The material of *Simoceras broilii* originally described by Schneid (1915) comes from the Ciliata Zone, Penicillatum horizon of Unterhausen near Neuburg a. d. Donau in Franconia (S. Germany), corresponding to the Fallauxi Zone (Scherzinger & Schweigert 1999; Schweigert & Scherzinger 2004), while the Hungarian specimen (Fozy & Scherzinger 2013) was collected from the Semiforme Zone. The "Trento Plateau" specimens were collected from lower Albertinum Zone (Voltascura Quarry section, Asiago, VI) and upper Albertinum Zone (Mt. Rust section, Lavarone, TN).

Kutekiceras Zeiss, 1968 and *Pseudopallasiceras* nov.gen.

Danubisphinctes comprises macroconchs originally described by Zeiss (1968) from the Lower Tithonian (Ciliata and Palmatus Zones) of Franconia (Germany). The corresponding microconchs are usually described under *Parapallasiceras* Spath, 1925. In the Mediterranean Province the dimorphic pair *Danubisphinctes* s.s./ *Parapallasiceras* s.s. does not occur; its distribution is in the Submediterranean Lower Tithonian and Volgian of the Subboreal Faunal province: SE France, St. Concors (Donze & Enay 1961), southern Germany, Franconia (Schneid 1915; Zeiss 1968; Schweigert & Scherzinger 2004), Central Poland (Kutek & Zeiss 1974, 1997). Fozy & Scherzinger (2013) also include in *Danubisphinctes* the genus *Isterites* Barthel, 1975 following Schweigert & Scherzinger (2004). The type species of *Parapallasiceras* (*Berriasella praecox* Schneid) comes from the Ciliata Zone, Penicillatum horizon of Unterhausen, near Neuburg a.d. Donau, Franconia, S Germany. This level can be correlated with the Fallauxi Zone, Richteri Subzone (Schweigert & Scherzinger, 2004; Fozy & Scherzinger, 2013).

There is a group of mediterranean ammonites of the Semiforme and Fallauxi zones which are homoeomorphic of *Danubisphinctes*. Indeed, Cecca (1990a) noted morphological differences between the Franconian *Danubisphinctes* and these homoeomorphs: *Danubisphinctes paracontiguus* Olóriz, *Danubisphinctes catriensis* Cecca and *Danubisphinctes mutabilis* Cecca. The species established by Cecca (1990a) from the Fallauxi Zone of the Apennines, are based on rather poorly preserved specimens. The genus *Blaschkeiceras* "M" was introduced by Zeiss (2001), together with *Kutekiceras* as the corresponding microconch, for perisphinctids from the Mediterranean Province. Both genera occur in the Fallauxi and Simplisphinctes zones. Fozy & Scherzinger (2013) noted that ancestors of these ammonites can be traced already from the lower Semiforme Zone in the Mediterranean Province. One example could be "*Parapallasiceras*" *toucasi* (Cecca & Enay, 1991) from the Fallauxi Zone. In the Trento Plateau the genus *Kutekiceras* (Type species: *Perisphinctes pseudocolubrinus* Kilian, 1895) is documented by the common species K. *pseudocolubrinum* in the Semiforme/Verruciferum Zone and by the rare species K. *steinbergensis* in the lower Fallauxi Zone. Other perisphinctids from the Tithonian have often been misidentified as *Kutekiceras* or *Parapallasiceras*: they differ considerably from the mediterranean ammonites assigned to these genera (e.g. "*Parapallasiceras*" *toucasi*). Because the dimorphic pair "*Danubisphinctes*" / "*Parapallasiceras*" and *Blaschkeiceras* / *Kutekiceras* seem to belong to a single phyletic lineage developed during the Tithonian in the Mediterranean Province, the meaning of these names overlap and it seems reasonable to erect a new generic name for these ammonites:

Pseudopallasiceras nov.gen. "m"

TYPE SPECIES: *Pseudopallasiceras mediterraneum* (Cecca, 1990). The type material comes from Fosso Bugarone (Monte Nerone, Marche Appennines, Italy); the holotype, with inventory number 18059 CP, is housed in the Museo del Servizio Geologico d'Italia (Roma).

DERIVATIO NOMINIS: after the homoeomorphic similarity of the shell with the representatives of the genus *Parapallasiceras* (submediterranean/sub-boreal province).

DIAGNOSIS: small to medium sized, evolute microconchs (diameter about 45 to 80 mm) with the last half to the last whorl representing the body chamber. Whorl section is subcircular to subtrapezoidal or oval. On the body chamber the whorl-section is always higher than wide. Ornamentation characterized by straight and radial ribbing, similar on the inner whorls to *Danubisphinctes*, consisting of biplicate ribs on the phragmocone, spaced on the inner whorls, which are replaced by biplicate and polygyrate ribs on the body chamber, which are splitting on the middle or upper third (especially on the inner whorls) of the flanks. The ribs are mainly biplicate. Polygyrate, Res and simple ribs rarely occurs. The ribs cross the venter without change, however a smooth ventral band can be observed, chiefly at a smaller diameter, although not in all specimens. The ribbing is more and more dense throughout the ontogeny. Constrictions occur, strong and deep.

SPECIES INCLUDED: *Pseudopallasiceras mediterraneum* (Cecca, 1990), *Pseudopallasiceras toucasi* (Cecca & Enay, 1991); *Pseudopallasiceras? pouzinensis* (Toucas, 1890); *Pseudopallasiceras?* aff. *pouzinensis* (Toucas,1890 in Sarti, this paper); *Pseudopallasiceras?* gr. *pouzinensis* (Toucas,1890 in Sarti, this paper); *Pseudopallasiceras?* gr. *pseudocolubrinoides* (Oloriz, 1978); *Pseudopallasiceras* nov.sp.1; *Pseudopallasiceras* aff. *guembeli* (Zeiss, 1968 in Sarti, this paper) represent the new genus in the Trento Plateau.

REMARKS AND COMPARISONS: *Danubisphinctes* and *Parapallasiceras* were often misidentified with homeomorph mediterranean Tithonian perisphinctids (Schweigert & Scherzinger 2004; Scherzinger et al. 2010). The mediterranean homeomorphic *Parapallasiceras* are included in the new genus *Pseudopallasiceras* and occurs in the Mediterranean Province during the Albertinum (= Darwini), Semiforme/Verruciferum and Fallauxi zones. The new genus is easy distinguishable from *Kutekiceras*: although *Pseudopallasiceras* resembles *Kutekiceras*, it clearly differs in a more involute coiling and in being much more densely ribbed. Contrary to the *Kutekiceras* species, moreover, the ribbing is not uniform, but the ribbing is more and more dense throughout the ontogeny (see Synoptic Table). Differences between *Pseudopallasiceras* n. gen. and *Parapallasiceras* s.s. are the strong radial arrangement of the rib bundles in the mediterranean forms contrasting the more projected secondaries of the submediterranean species; moreover the primary ribs are always rigid in these mediterranean forms of the new genus *Pseudopallasiceras*. *Subplanites* differs from *Pseudopallasiceras* in its more flexuous ribbing; moreover *Subplanites* occurs in a lower stratigraphic position (Beckeri and Hybonotum Zones).

BIOCHRONOSTRATIGRAPHY: Upper Albertinum Zone, Semiforme/Verruciferum Zone, Richteri Zone and basal Biruncinatum Zone in the Trento Plateau sections (Southern Alps, Italy).

Pseudopallasiceras mediterraneum (Cecca, 1990)

Pl.5, fig.2; text-figs.6, 12

pars 1870 *Perisphinctes contiguus* Catullo - Zittel, p.110, pl.11, fig. 2a-b, NON pl.11, fig.1

1990b *"Subplanitoides" mediterraneus* n.sp., Cecca, p.58, pl..1, fig.1-4 (cum syn)

2004 *"Subplanitoides" mediterraneus* Cecca - Angelelli & Rossi, p.35, pl.7, fig.1

MATERIAL: two specimens from Monte Rust section (Lavarone, Trento) and Roccolo section (Lavarone, Trento) with inventory numbers M331.191 and R157.16

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
Holotype	77	0.39	0.35	0.30	60 (33)	B.C.
"	61	0.35	0.38	-	58 (34)	?
R157.16	73.5	0.42	0.34	0.302	58? (33)	B.C.
"	61.5	0.406	0.357	0.32	- (33)	B.C.
M331.191	78.5	0.39	0.356	-	- (29)	B.C.

DESCRIPTION: the species is fully described in Cecca (1990b). The specimen R157.16 is a moderately evolute shell. The last half whorl corresponds to the body chamber. The ribbing is composed of biplicate ribs on the inner whorls, biplicate and triplicate ribs on the B.C., but mainly biplicate. The ribs split from the upper third of the flanks to the ventro-lateral margin; on the inner whorls the secondary ribs are covered by the next whorl. Ribs are straight on the flanks and slightly arched forward on venter. Specimen M331.191 is a moderately evolute half whorl of body chamber. Ribbing is biplicate and triplicate (mainly biplicate) and the ribs split from the middle to the upper third of the flanks. Ribs are prosocline on the umbilical edge and straight on the flanks. Only towards the end of the body chamber ribs are slightly flexuous.

REMARKS: Specimen R157.16 differs from the "typical " *P. mediterraneum* by having a slightly wider umbilicus and mainly biplicate ribs with lower number of triplicate on the B.C. (contrary to the type series where the ribs are mainly triplicate). The specimen figured by Zittel (1870, pl.11, fig. 2) shows a lower bifurcation point of the ribs. Specimen M331.191 also differs from the "typical" *P. mediterraneum* by having mainly biplicate ribs and lower number of triplicate on the B.C. *Subplanites contiguus* (Catullo) from the Beckeri Zone differs from *P. mediterraneum* (Cecca) (as *Perisphinctes contiguus* Catullo in Zittel, 1870 pl. 11, fig. 2a-b) and from *Pseudosubplanitoides spindelense* (Zeiss, 1968) by having the whorls more inflate and more rapidly growing, with more flexuous and prorsiradiate ribs and lower number of intercalars on the outer whorl. Moreover, *P. spindelense* and *P. mediterraneum* show all their ribs bifurcate in specimens of similar size, while S. *contiguus* Catullo has polygyrate ribs at comparable diameter. *P. mediterraneum* differs from *P. spindelense* in having a smaller umbilicus and a more flexuous ribbing, as well as a different whorl section.

BIOCHRONOSTRATIGRAPHY: *P. mediterraneum* was reported from the Semiforme Zone by Cecca (1990b). The "Trento Plateau" specimens were collected from the lower part of the Semiforme / Verruciferum Zone (just above the acme of *Haploceras verruciferum* within the investigated area).

Pseudopallasiceras toucasi (Cecca & Enay, 1991)
Pl.5, fig.3; text-fig.6

pars 1986 *Subdichotomoceras pseudocolubrinus* (Kilian) - Sarti, p.500, tav.3, fig.4

1991 *Parapallasiceras toucasi* n. sp. - Cecca, Enay, p. 66, pl. 8, fig. 6, pl. 9, figs. 1 (holotype) -3, text-fig. 22 a-d.

1994 *Parapallasiceras* (aff.) *toucasi* Cecca - Zeiss *et al*, p.372, pl.4, fig.4, pl.5, fig.4 (NON fig.3)

2013 "*Parapallasiceras*" *toucasi* Cecca, Enay - Fozy & Scherzinger, p.233, Pl.15, fig.17

MATERIAL: specimens MR318, MR332, MR333, CA383 (cf.-specimen), SAR179, A107C-1(cf.-specimen), BP40, A64C-1, PE430, P65A, P303A (cf.-specimen)

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
Holotype	73.5	0.48	0.35	0.265	46? (23)	B.C.
Zeiss *et al*. pl.4/4	67	0.462	0.313	0.328	45 (23)	B.C.
SAR179	61	0.50	0.313	0.278	52 (30)	B.C.
"	57.3	0.486	0.314	-	49 (25)	B.C.
"	49.3	0.521	0.283	-	47 (24)	Ph.
BP40	58	0.456	0.293	-	42 (25)	B.C.
"	46	0.391	0.304		40 (23)	Ph.
A64C	63.2	0.427	0.30	-	53 (27)	B.C.
MR318	58.6	0.443	0.341	0.317	- (26)	B.C.
P303A	66	0.477	0.318	0.262	- (31-32?)	B.C.?

BIOCHRONOSTRATIGRAPHY: the species P. *toucasi* was recorded from the Fallauxi Zone of the SE France by Cecca *et al.* (1989), Cecca & Enay (1991), Romania (Avram 1976), Morocco (Benzaggagh & Atrops, 1997), Hungary (Fozy & Scherzinger 2013); and from the middle Semiforme/Verruciferum Zone of the Lessinian Alps (Verona, Italy) by Zeiss *et al*. (1994). The "Trento Plateau" specimens were collected in the Col Santino section (M. Pasubio) from the boundary Richteri Zone / Biruncinatum Zone, and from the lower Semiforme / Verruciferum Zone (acme of *H. verruciferum* within the investigated area), in the Lavarone sections (TN) from the lower Semiforme /Verruciferum Zone, in the Cava Cortese section (Asiago) from the middle and upper parts of the Semiforme /Verruciferum Zone, in the Pergola quarry (Grezzana near Verona) from the lower Semiforme /Verruciferum Zone (acme of *H. verruciferum* within the investigated area).

Pseudopallasiceras? pouzinensis (Toucas,1890)
Pl.5, fig.4; text-fig.5

1890 *Perisphinctes pouzinensis* Toucas, p. 584, pl. 14, fig. 6.

1991 *"Subplanitoides" pouzinensis* (Toucas, 1890) - Cecca, Enay, p. 62, pl. 3, fig. 2, pl. 4, fig. 1-2, pl. 6, fig. 2-3, pl. 7, fig. 2-3, pl. 8, fig. 2-5, text-fig. 21 b-i, (cum syn.)

2013 "*Subplanitoides*" *pouzinensis* (Toucas, 1890) - Fozy & Scherzinger, p.229, pl.12, fig.1, pl. 13, fig.1, pl. 15, figs. 11, 14, 16

MATERIAL: Specimens G281, G283, PE429, C.BP106 (cf.-specimen), PE441 (cf.-specimen).

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
Holotype, inv.n. MNHNJ00089	75.2	0.432	0.332	0.292	60 (30)	B.C.
Syntype, inv.n. MNHNJ08545	43	0.42	-	-	50? (26)	B.C.
G283	68	0.361	0.441	0.352	- (30)	B.C.
G281	52.5	0.361	0.40	-	48 (26)	B.C.
PE429	70	0.385	0.385	-	51? (27)	B.C.

BIOCHRONOSTRATIGRAPHY: P. *pouzinensis* was described by Cecca *et al*. (1989) and Cecca & Enay (1991) from the Fallauxi zone of the SE France (including the original specimens of Toucas). The specimens figured by Fozy & Scherzinger (2013) were collected from the Fallauxi Zone of Hungary. Our specimens belong to the lower Semiforme/Verruciferum Zone (acme of *H. verruciferum*) in the Lavarone sections (Trento), in the Pergola Quarry (Grezzana, Verona) and in the Colle Oro section (Mt.Grappa).

Pseudopallasiceras*? gr. *pouzinensis (Toucas,1890)

MATERIAL: A single specimen (P236A).

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
P236A	77	0.415	0.363	-	59-60 (31)	B.C.

BIOCHRONOSTRATIGRAPHY: boundary Volanense Zone / Biruncinatum Zone (Col Santino section, Mt.Pasubio).

Pseudopallasiceras*? aff. *pouzinensis (Toucas,1890)
Pl.6, fig.1; text-fig.5

MATERIAL: Two specimens (P221A, P219A).

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
P221A	75	0.40	0.333	0.26- 0.28	51-52 (24)	B.C.
"	60	0.378	0.383	0.30	-	B.C.
P219A	c.60	0.36-0.38	0.341	0.258	- (28)	B.C.

BIOCHRONOSTRATIGRAPHY: top Semiforme /Verruciferum Zone and lower Fallauxi Zone (Col Santino section, Mt.Pasubio)

Pseudopallasiceras?* gr. *pseudocolubrinoides (Oloriz, 1978)

gr. 1978 *Parapallasiceras pseudocolubrinoides* n.sp. Oloriz, p.555, pl.55, fig.3

MATERIAL: A single specimen (P277A).

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
Holotype	41.2	0.60	0.218	0.242	- (15)	B.C.
P277A	57	0.526	0.280	-	- (17)	B.C.

BIOCHRONOSTRATIGRAPHY: top of the Richteri Zone (Col Santino section, Mt.Pasubio).

***Pseudopallasiceras* nov.sp.1**
Pl.6, fig.2; text-fig.5

MATERIAL: three specimens: P214A, M364.224tris, P301A (cf.-specimen)

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
P214A	82	0.414	0.365	-	63 (39)	B.C.
"	75.4	0.411	0.371	0.331	60 (35)	B.C.
"	67	0.425	0.335	-	51 (31)	
P301A	67	0.402	0.358	-	-	B.C.

BIOCHRONOSTRATIGRAPHY: Our specimens attributed to *Pseudopallasiceras* nov.sp.1 come from the lower (just above the acme of *H. verruciferum*), middle, and upper parts of the Semiforme / Verruciferum Zone in the Col Santino section (Mt.Pasubio).

Pseudopallasiceras* aff. *guembeli (Zeiss, 1968)
Pl.6, fig.3; text-fig.5

aff. 1968 *Torquatisphinctes guembeli* sp.n. Zeiss, p.51, pl.7, fig.1; pl.8, fig.7

MATERIAL: A single specimen (BPV384).

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
Holotype	63.6	0.466	0.336	-	- (25)	B.C.
BPV384	66	0.472	0.287	-	56 (34)	B.C.

BIOCHRONOSTRATIGRAPHY: lower Semiforme/Verruciferum Zone in the Bus De Pissavacca section (Lavarone, TN)

***Pseudosubplanitoides* nov.gen. "m"**

TYPE SPECIES: *Pseudosubplanitoides apenninicum* (Cecca, 1990). Grotte di S. Eustachio (Monte San Vicino, Marche Appennines, Italy); holotype with inventory number 18105 CP, housed in the Museo del Servizio Geologico d'Italia (Roma).

DERIVATIO NOMINIS: after the similarity with *Subplanitoides* from submediterranean province.

DIAGNOSIS: small to medium size, moderately evolute microconchs (diameter about 50 to 90 mm). The body chamber occupies half to three quarters of the last whorl. Whorl section fastigate subacute to sub-oval trapezoidal. The maximum whorl width is always observed at the umbilical margin. The peristome has lappets. Ornamentation characterized by distant and slightly flexuous ribbing, tending to become more widely spaced through the ontogeny. Ribs bifurcate and trifurcate in variable proportions at middle or 2/3 of the whorl height. In inner whorls the ribs are mainly biplicate and more prorsiradiate than on the outer whorls. Secondary ribbing mostly covered by the next whorl. Constrictions occur.

SPECIES INCLUDED: *Pseudosubplanitoides apenninicum* (Cecca, 1990), *Pseudosubplanitoides* aff. *apenninicum* (Cecca, 1990 in Sarti, this paper), *Pseudosubplanitoides pseudocontiguus* (Donze & Enay, 1961 in Cecca, 1990), *Pseudosubplanitoides schwertschlageri* (Zeiss, 1968), *Pseudosubplanitoides* gr. *schwertschlageri* (Zeiss, 1968 in Sarti, this paper), *Pseudosubplanitoides oppeli* (Zeiss, 1968), *Pseudosubplanitoides sp*. 1, *Pseudosubplanitoides* sp. 2, and *Pseudosubplanitoides spindelense* (Zeiss, 1968) represent the new genus in the Trento Plateau.

REMARKS AND COMPARISONS: for these mediterranean forms, homoeomorphic of *Subplanitoides*, a new generic name is

needed. The genus *Subplanitoides* is described in Cecca (1990b). Additional details were given by Fozy & Scherzinger (2013): the genus *Subplanitoides* s.str. (the type species *Subplanitoides waltheri* Zeiss and those figured in Scherzinger & Schweigert 2003) includes submediterranean species not directly linked with similar forms from the Fallauxi Zone of France, nor with older forms of the Darwini and Semiforme Zones of N and Central Italy (Sarti 1986, 1988; Cecca 1990a,b). These two different groups, referred by Fozy & Scherzinger (2013) as true and false *Subplanitoides,*in fact have different dimorphic pairs: *Subplanitoides* s.str. "m"/ *Usseliceras* "M" with regard to their "true" *Subplanitoides*. In the case of the Mediterranean species the *Subplanitoides* s.l. *pouzinensis* "m" / "*Pseudodiscosphinctes*" *chalmasi* "M" groups may represent their "false" *Subplanitoides*. The group of mediterranean "*Subplanitoides"* is completely artificial and includes species which belong to different genera. Some mediterranean "*Subplanitoides"* belong to the new genus *Pseudopallasiceras* and some others to the new genus *Pseudosubplanitoides.* Both of these new genera are considered representing microconchs.

I propose that *Pseudosubplanitoides* could derive from *Silicisphintes* Schweigert & Zeiss, 1999 [m] / *Lithacoceras*[M]. *Pseudopallasiceras* n. gen. (reported from the Semiforme Zone) should have evolved rapidly from the ancestor *Pseudosubplanitoides* n. gen*. Pseudosubplanitoides* n. gen*.* differs from *Silicisphinctes* by its more rigid ribbing and from *Pseudopallasiceras* n. gen. by its more flexuous ribbing. Also, the whorl section considerably differs from that of *Pseudopallasiceras* n. gen*.* Only the earliest representatives of *Pseudosubplanitoides* n. gen*.* possess a slightly more flexuous ribbing. The variable character in fact is represented by the morphological evolution of the shape of ribs: from *Silicisphinctes* to *Pseudopallasiceras* via *Pseudosubplanitoides* n. gen*.* the ribs grade from flexuous to rigid*.* Within the chronocline the ribbing gradually tends to becomes more and more rigid. The new genus *Pseudosubplanitoides* shows a whorl-section fastigate sub-acute to sub-oval trapezoidal, always with maximum whorl width at the umbilical borders. A few specimens show a lappet like prolongation at the end of the adult body chamber.

BIOCHRONOSTRATIGRAPHY: top Hybonotum Zone (transient morphotypes) and Albertinum Zone.

Pseudosubplanitoides apenninicum (Cecca, 1990)
Pl.6, fig.5A, B; text-fig.7

1990a *Usseliceras (Subplanitoides) apenninicum* n.sp. Cecca, p.43, pl.2, fig.1-2

MATERIAL: two specimens from Mt. Rust (Lavarone, Trento) and Cortese Quarry (Asiago, Vicenza) with inventory numbers ME735, A384C-3

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
holotype	72	0.43	0.32	0.26	60 (32)	B.C.
Paratype	70	-	0.36	-	- (30)	B.C.
ME735	72.8	0.453	0.322	0.274	-51 (30)	B.C.
"	52	0.48	0.278	0.269	48 (29)	end ph.
A384C	65	0.461	0.276	-	50? (29)	B.C.

DESCRIPTION AND REMARKS: the species is fully described in Cecca (1990b). The last half whorl represents the body chamber in our specimens. The species *Pseudosubplanitoides schwertschlageri* (Zeiss, 1968) differs from the *P. appenninicum* group in having more numerous ribs and a typical fastigate, sub-acute whorl-section. The typical *Pseudosubplanitoides* and *Silicisphinctes* representatives differ also significantly from *P.schwertschlageri*, since they have more compressed whorl section. *P. oppeli* (Zeiss) differs from the other species of *Pseudosubplanitoides* in having a more or less wide flat siphonal smooth band with a ventral groove, and from *P. schwertschlageri* also in having ribs splitting higher, between middle and upper third of the flank. *Pseudosubplanitoides pseudocontiguus* (Donze & Enay, 1961 in Cecca, 1990b) possesses a body chamber of three quarters of whorl, and another difference with respect to *P. appenninicum* is the more widely spaced and rigid ribbing.

BIOCHRONOSTRATIGRAPHY: The type specimens were collected by Cecca (1990b) from the Darwini Zone. Our specimens come from the lower and middle parts of the Albertinum Zone in the Trento Plateau sections (Southern Alps, Italy).

Pseudosubplanitoides* aff. *apenninicum (Cecca, 1990)
Pl.7, fig.1A, B; text-fig.7

aff. 1990a *Usseliceras (Subplanitoides) apenninicum* n. sp. Cecca, p.43, pl.2, fig.1-2

MATERIAL: one specimen from Ex Comando Austriaco section (Virti, Trento) with inventory number V270.130

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
V270.130	100.2	0.459	0.29	-	64 (32)	B.C.
"	81.2	0.431	0.32	0.28	- (31)	B.C.

REMARKS: the specimen is transitional between *Silicisphinctes* and *Pseudosubplanitoides.* The specimen shows a lappet-like peristomatic projection and is larger in size with respect to the type species of the genus.

BIOCHRONOSTRATIGRAPHY: The specimen was collected from a bed assigned to the top of the Hybonotum Zone, that is near the boundary Hybonotum/Albertinum Zone.

***Pseudosubplanitoides* sp.**
Pl.7, fig.4A, B; text-fig.10

1980 *Lithacoceras (Subplanites)* sp. - Ohmert & Zeiss, p.33, pl.12, fig.5

MATERIAL: A single specimen (MR276).

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
Ohmert & Zeiss (1980) pl.12/5	75	0.43	0.32	0.24	- (31)	B.C.
MR276	78.3	0.485	0.312	0.268	57 (31)	B.C.
"	64	0.476	0.312	0.265	50 (30)	B.C.

REMARKS AND BIOCHRONOSTRATIGRAPHY: present specimen shows morphology and sculpture transitional between Silicisphinctes and Pseudosubplanitoides n. gen. to which is preliminary assigned. Top Hybonotum Zone (M.Rust section, Lavarone, TN). Ohmert & Zeiss (1980): Hybonotum Zone in the Schwäbischen Alb (Südwestdeutschland).

Pseudosubplanitoides pseudocontiguus (Donze & Enay, 1961) in Cecca (1990)

1990b "Subplanitoides" pseudocontiguus (Donze & Enay, 1961) Cecca, p.45, pl.1, fig.3,

MATERIAL: Specimens P269A, C.BP8 (cf.-specimen)

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
Holotype	80	0.43	0.31	0.23	47 (25)	B.C.
Paratype	61	0.44	0.32	0.28	?	B.C.
Cecca 1990 pl.1/3	71	0.45	0.31	0.25	- (21)	B.C.
P269A	86.2	0.445	0.336	-	50 (27)	B.C.
"	60	0.466	0.333	-	- (18)	B.C.
C.BP8	66.2	0.422	0.317	-	- (30)	B.C.

BIOCHRONOSTRATIGRAPHY: upper Albertinum Zone (Bus De Pissavacca section, Lavarone, TN and Col Santino section, Mt.Pasubio). The specimen figured by Cecca (1990b) was collected from the Darwini Zone.

Pseudosubplanitoides* gr. *schwertschlageri (Zeiss, 1968)

gr.1968 *Usseliceras* (*Subplanitoides*) *schwertschlageri* sp.n. Zeiss, p.70, pl.8, figs.1,3,5

MATERIAL: A single specimen (P64A).

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
P64A	c.80 ?	0.462	0.312	0.325	- (42)	B.C.
"	50	0.420	0.40	0.34	- (33)	Ph.

BIOCHRONOSTRATIGRAPHY: middle Albertinum Zone (Col Santino, Mt.Pasubio).

Pseudosubplanitoides schwertschlageri (Zeiss, 1968)
Pl.7, fig.3; text-fig.7

1968 *Usseliceras (Subplanitoides) schwertschlageri* sp.n. Zeiss, p.70, pl.8, figs.1,3,5

MATERIAL: A single specimen (MR255).

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
Holotype	70.3	0.40	0.33	-	58 (37)	B.C.
"	64.7	0.38	0.36	-	- (33)	B.C.?
"	49.6	0.41	0.35	-	- (20)	Ph.?
Syntype	54.6	0.39	0.34	-	- (28)	B.C.?
MR255	80.3	0.418	0.358	0.311	-	B.C.
"	71.5	0.405	0.35	-	- (40?)	B.C.

BIOCHRONOSTRATIGRAPHY: upper Albertinum Zone (M. Rust section, Lavarone, TN).

Pseudosubplanitoides oppeli (Zeiss, 1968)
Text-fig.7

1968 *Usseliceras* (*Subplanitoides*) *oppeli* sp.n. Zeiss, p.73, pl.8, figs.2, 6

MATERIAL: A single specimen (P68A).

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
Holotype	57	0.37	0.36	-	61 (36)	B.C.
Syntype	56	0.43	0.33	-	- (34)	B.C.?
P68A	78	0.41	0.32	0.314	- (38)	B.C.

BIOCHRONOSTRATIGRAPHY: middle-upper Albertinum Zone (Col Santino section, Mt.Pasubio).

***Pseudosubplanitoides* sp. 1**
Text-fig.7

MATERIAL: A single specimen (BP 115).

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
BP115	c.86.5	0.502	0.323	-	50 (27)	B.C.
"	72.2	0.526	0.263	0.235	-	B.C.
"	45	0.522	0.266	0.266	- (26)	Ph.

BIOCHRONOSTRATIGRAPHY: Albertinum Zone (Bus de Pissavacca section, Lavarone, TN).

***Pseudosubplanitoides* sp. 2**

MATERIAL: A single specimen (P63A).

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
P63A	78.5	0.50	0.32	0.254	- (29)	B.C.

BIOCHRONOSTRATIGRAPHY: middle-upper Albertinum Zone (Col Santino section, Mt. Pasubio)

Pseudosubplanitoides spindelense (Zeiss 1968)
Pl.7, fig.2A, B; text-figs.7, 11

1968 *Usseliceras (Subplanitoides) spindelense* sp.nov. Zeiss, p.66, pl.3, fig.2
1968 *Usseliceras (Subplanitoides) spindelense grande* subsp. nov. Zeiss, p.67, pl.3, fig.3
1978 *Subplanitoides sp.cfr. spindelense grande* Zeiss - Oloriz, p.527
1990b *Usseliceras (Subplanitoides) spindelense* Zeiss - Cecca, p.43, pl.2, fig.3,5

MATERIAL: A386C-3, A24V, P73A (cf.-specimen), P77A (cf.-specimen)

SPECIMEN	D	U/D	H/D	W/D	UR (UR/2)	Part
Holotype *grande*	89	0.40	0.33	-	60? (32)	B.C.
Holotype *spindelense*	72.5	0.41	0.35	-	52 (28)	B.C.
Cecca (1990b) pl.2/4	91	0.43	0.33	0.25	- (35)	B.C.
Cecca (1990b) pl.2/3	94	0.40	0.34	0.26	60 (34)	B.C.
"	77	0.42	0.30	-	- (30)	B.C.
Holotype *mediterraneus*	77	0.39	0.35	0.30	- (33)	B.C.
"	61	0.35	0.38	-	- (34)	
A386C	88	0.413	0.318	0.272	50? (26)	B.C.
"	69	0.420	0.355	0.318	- (24)	B.C.
A24V	84.4	0.44	0.308	-	60 (34)	B.C.
"	68.5	0.43	0.306	-	- (33)	B.C.
P77A	58.3	0.385	0.332	-	-	B.C.

REMARKS AND BIOCHRONOSTRATIGRAPHY: specimens show morphology and sculpture transitional between *Pseudosubplanitoides* n. gen. and *Pseudopallasiceras* n. gen.

The specimens figured by Oloriz (1978) were collected from the Verruciferum Zone of the Betic Cordillera (Spain), and the specimens figured by Cecca (1990b) from the Darwini Zone. Our specimens from the Trento Plateau come from the lower and middle Albertinum Zone (Cortese Quarry section, Asiago) and middle Albertinum Zone (Col Santino section, M.Pasubio).

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Plate 1 *- Fig.1 A, B, C - Dorsomorphites exornatum (Catullo, 1853) from Malcesine (near Verona, Northern Italy). Holotype, inventory number Pad.6891-C, housed in the Museo di Geologia e Paleontologia of the University of Padova, Italy. (All figures are x 0.9) / fig.1 A, B, C - Dorsomorphites exornatum (Catullo, 1853) da Malcesine (Verona). Olotipo, numero di inventario Pad.6891-C, conservato presso il Museo di Geologia e Paleontologia della Università di Padova. (Tutte le figure sono x 0.9).*

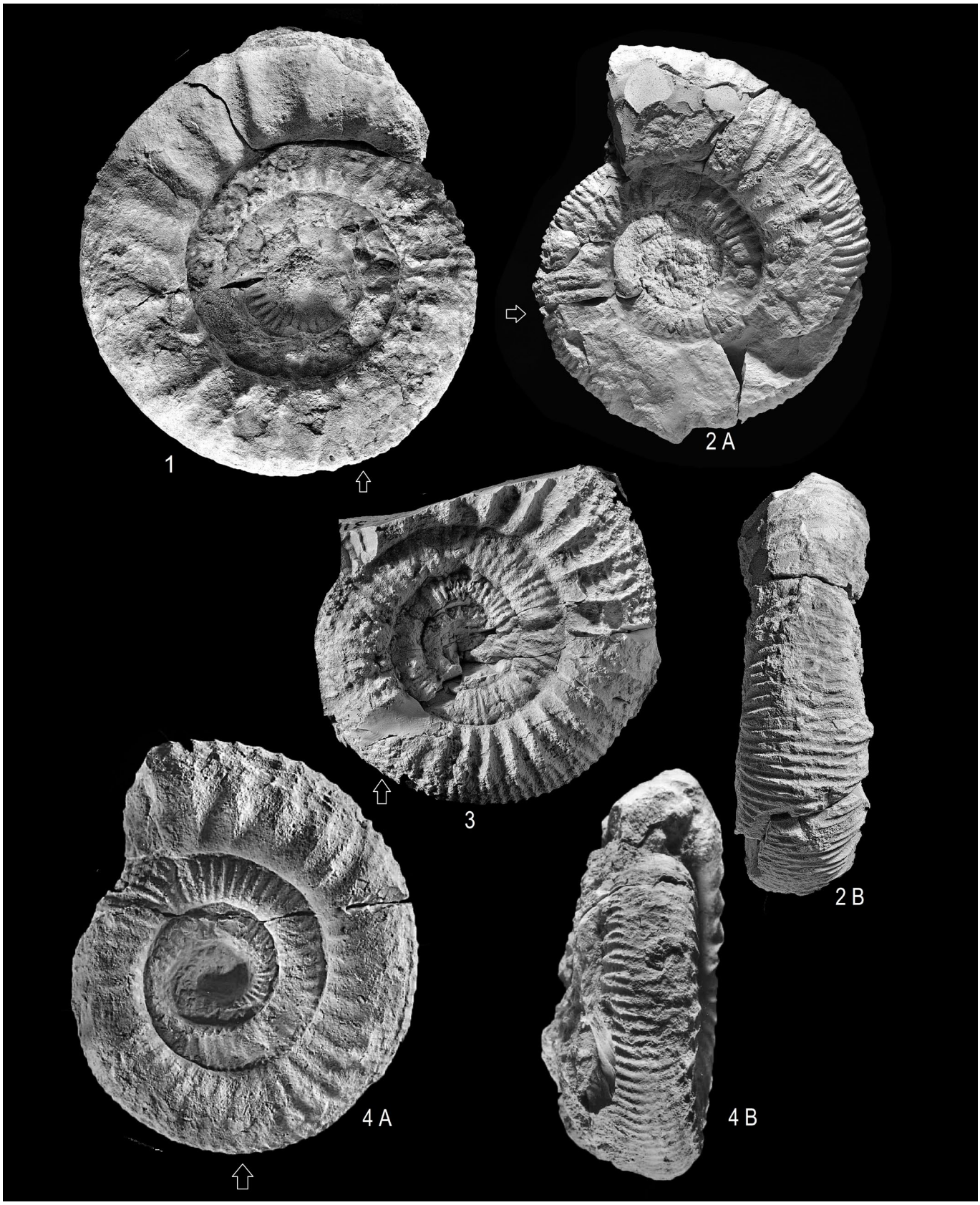


Plate 2 *- Fig.1 - Dorsomorphites bassanii (Del Campana,1905) from Cortese quarry near Asiago (Vicenza), inv.n. A90C-2. Lower Semiforme/Verruciferum Zone; fig. 2A, B - Dorsomorphites bassanii (Del Campana,1905) from Col Santino section (Mt.Pasubio near Rovereto), inv.n. P122A. Lower part of the Fallauxi Zone; fig. 3 - Dorsomorphites exornatum (Catullo, 1853) from Monte Rust section (Lavarone, Trento), inv.n. MR311. Middle part of the Semiforme/Verruciferum Zone; fig. 4A, B - Dorsomorphites selectus (Neumayr, 1873) from Roccolo section (Lavarone, Trento), inv.n. R180.40. Basal Semiforme/Verruciferum Zone. (All figures are x 0.9. Specimens have been coated with ammonium chloride before photography. Arrows showing the beginning of the body chamber.) / Fig.1 - Dorsomorphites bassanii (Del Campana,1905) dalla Cava Cortese (Asiago, Vicenza), n.inv. A90C-2. Parte inferiore della Zona a Semiforme/Verruciferum; fig. 2A, B - Dorsomorphites bassanii (Del Campana,1905) dalla sezione del Col Santino (M.Pasubio, Rovereto), n.inv. P122A. Parte inferiore della Zona a Fallauxi; fig. 3 - Dorsomorphites exornatum (Catullo, 1853) dalla sezione del Monte Rust (Lavarone, Trento), n.inv. MR311. Parte media della Zona a Semiforme/Verruciferum; fig. 4A, B - Dorsomorphites selectus (Neumayr, 1873) dalla sezione Roccolo (Lavarone, Trento), n.inv. R180.40. Parte basale della Zona a Semiforme/Verruciferum. (Tutte le figure sono x 0.9. Gli esemplari sono stati trattati con cloruro di ammonio prima di essere fotografati. Una freccia indica l'inizio della camera d'abitazione.)*

Plate 3 *- Fig.1A, B - Dorsomorphites aff. negrii (Del Campana,1905) from Monte Rust section (Lavarone, Trento), inv.n. MR180. Upper part of the Albertinum Zone. (All figures are actual size. Specimens have been coated with ammonium chloride before photography. Arrows showing the beginning of the body chamber.) / Fig.1A, B - Dorsomorphites aff. negrii (Del Campana,1905) dalla sezione del Monte Rust (Lavarone, Trento), n.inv.MR180. Parte superiore della Zona ad Albertinum. (Tutte le figure sono a grandezza naturale. Gli esemplari sono stati trattati con cloruro di ammonio prima di essere fotografati. Una freccia indica l'inizio della camera d'abitazione.)*

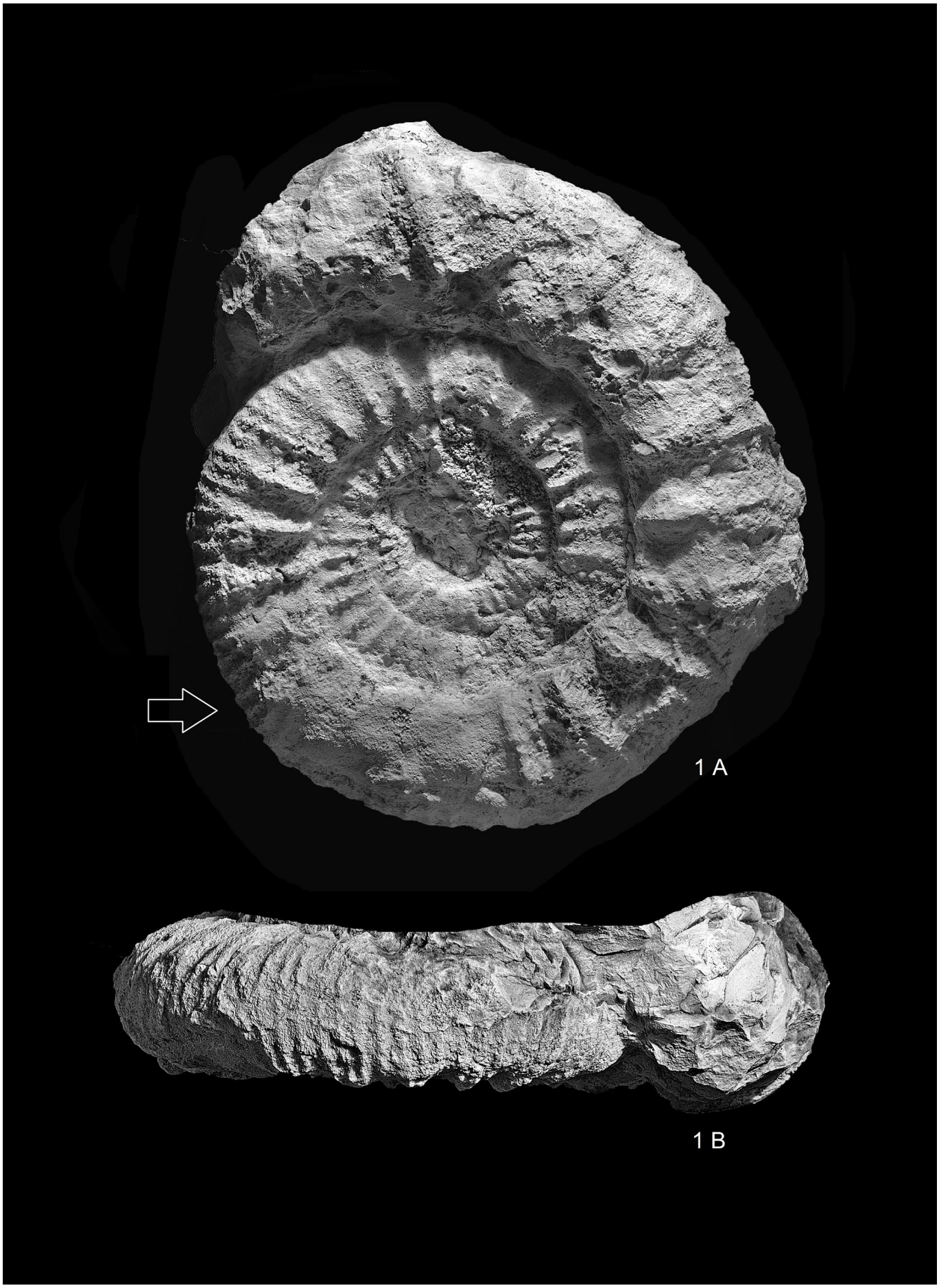

1 A
1 B

Plate 4 *- Fig. 1 - Virgatomorphites pseudorothpletzi nov.sp. from Cortese quarry section near Asiago (Vicenza, Italy). Holotype, inventory number A134C-1. Middle part of the Albertinum Zone; fig. 2A, B - Virgatomorphites pseudorothpletzi nov.sp. from Cortese quarry section near Asiago (Vicenza), inv.n. A390C-3. Lower part of the Albertinum Zone; fig.3 - Virgatomorphites pseudorothpletzi nov.sp. from Col Santino section (Mt.Pasubio near Rovereto), inv.n. P35A. Middle part of the Albertinum Zone. (All figures are actual size. Specimens have been coated with ammonium chloride before photography. Arrows showing the beginning of the body chamber.) / Fig. 1 - Virgatomorphites pseudorothpletzi nov.sp. dalla sezione di cava Cortese (Asiago, Vicenza). Olotipo, numero di inventario A134C-1. Parte media della Zona ad Albertinum Zone; fig. 2A, B - Virgatomorphites pseudorothpletzi nov.sp. dalla sezione di cava Cortese (Asiago,Vicenza), n.inv. A390C-3. Parte bassa della Zona ad Albertinum; fig.3 - Virgatomorphites pseudorothpletzi nov.sp. dalla sezione del Col Santino (M.Pasubio, Rovereto), n.inv. P35A. Parte media della Zona ad Albertinum. (Tutte le figure sono a grandezza naturale. Gli esemplari sono stati trattati con cloruro di ammonio prima di essere fotografati. Una freccia indica l'inizio della camera d'abitazione.)*

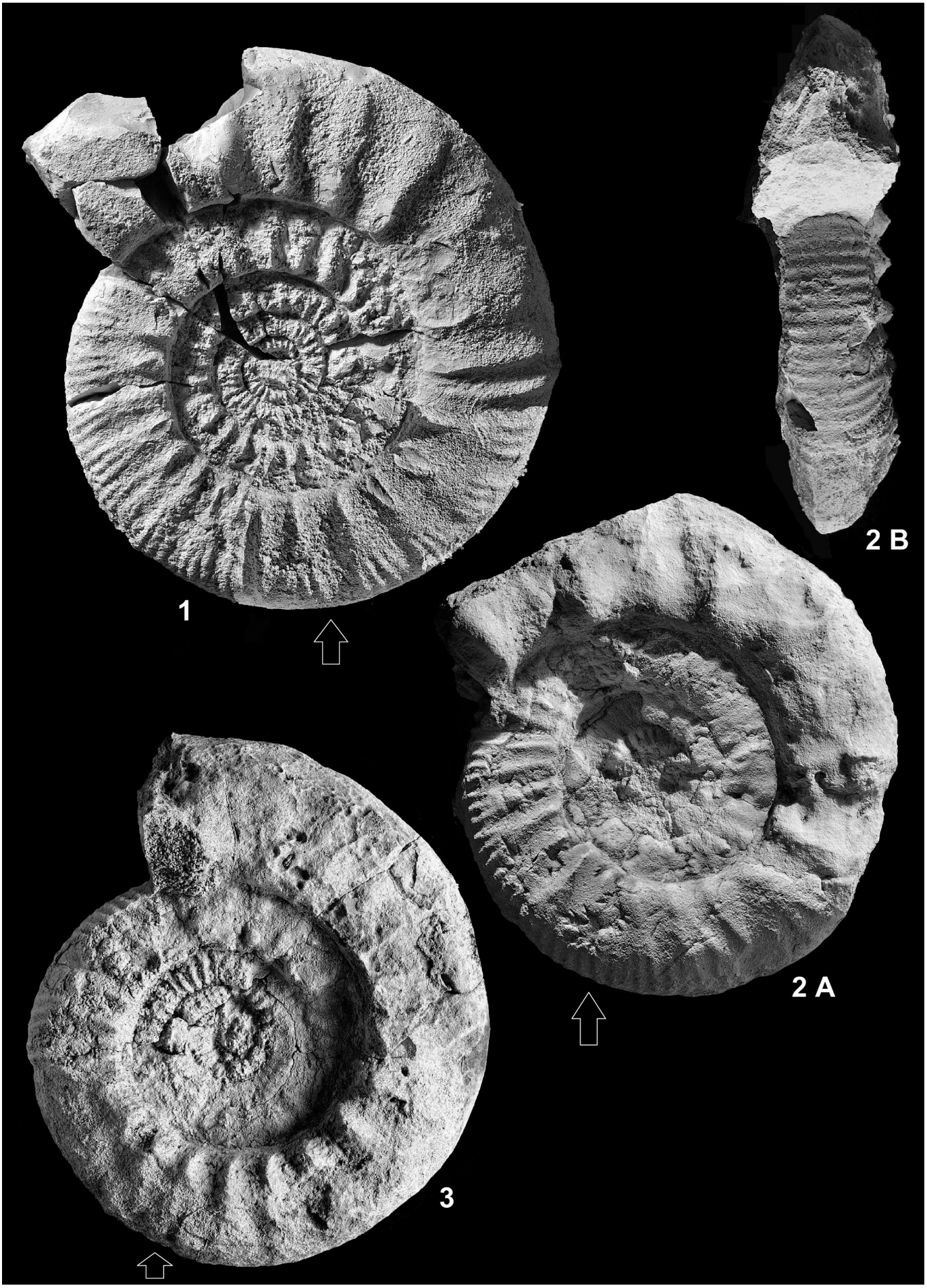

1
2 B
2 A
3

Plate 5 *- Fig. 1A, B - Virgatomorphites sp.2 gr.broilii (Schneid, 1915) from Monte Rust section (Lavarone, Trento), inv.n. MR186. Upper Albertinum Zone; fig. 2 - Pseudopallasiceras mediterraneum (Cecca, 1990) from Monte Rust Section (Lavarone, Trento), inv.n. M331-191. Lower part of the Semiforme /Verruciferum Zone; fig. 3 - Pseudopallasiceras toucasi (Cecca & Enay, 1991) from Virti Section (Trento), inv.n. SAR179. Lower Semiforme /Verruciferum Zone; fig. 4 - Pseudopallasiceras pouzinensis (Toucas,1890) from Colle Oro section (Mt.Grappa, Belluno), inv.n.G281. Lower Semiforme/Verruciferum Zone. (All figures are x 0.9. Specimens have been coated with ammonium chloride before photography. Arrows showing the beginning of the body chamber.) / Fig. 1A, B - Virgatomorphites sp.2 gr.broilii (Schneid, 1915) dalla sezione del Monte Rust (Lavarone, Trento), n.inv.MR186. Parte alta della Zona ad Albertinum; fig. 2 - Pseudopallasiceras mediterraneum (Cecca, 1990) dalla sezione del Monte Rust (Lavarone, Trento), n.inv. M331-191. Parte bassa della Zona a Semiforme /Verruciferum; fig. 3 - Pseudopallasiceras toucasi (Cecca & Enay, 1991) dalla sezione Virti (Trento), n.inv. SAR179. Parte bassa della Zona a Semiforme /Verruciferum; fig. 4 - Pseudopallasiceras pouzinensis (Toucas,1890) dalla sezione del Colle Oro (M.Grappa, Belluno), n.inv.G281. Parte bassa della Zona a Semiforme/Verruciferum. (Tutte le figure sono x 0.9. Gli esemplari sono stati trattati con cloruro di ammonio prima di essere fotografati. Una freccia indica l'inizio della camera d'abitazione.)*

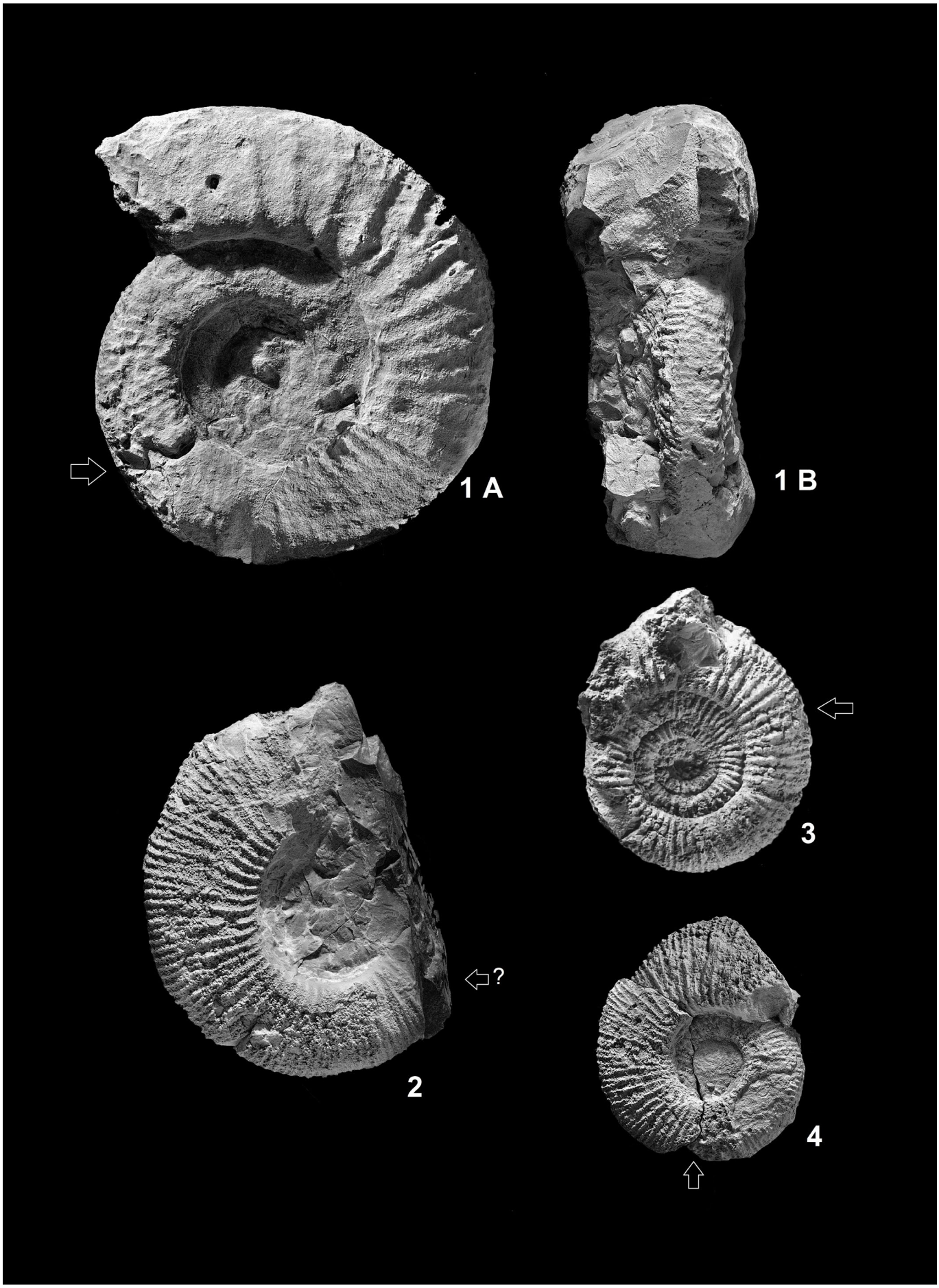

1 A
1 B
?
2
3
4

Plate 6 *- Fig.1 - Pseudopallasiceras aff. pouzinensis (Toucas,1890) from Col Santino section (Mt.Pasubio near Rovereto), inv.n. P221A. Lower Fallauxi Zone; fig.2 - Pseudopallasiceras nov.sp.1 from Col Santino Section (Mt.Pasubio near Rovereto), inv.n. P214A. Semiforme/Verruciferum Zone; fig.3 - Pseudopallasiceras aff. guembeli (Zeiss 1968) from Bus de Pissavacca Section (Lavarone, Trento), inv.n. BPV384. Lower Semiforme/Verruciferum Zone; fig.4A, B - Silicisphinctes gregorioi (Del Campana, 1905) from Bus de Pissavacca section (Lavarone, Trento), inv.n. BPV244. Top Beckeri/Pressulum Zone; fig. 5A,B - Pseudosubplanitoides apenninicum (Cecca, 1990) from Monte Rust Section (Lavarone, Trento), inv.n. ME735. Albertinum Zone. (All figures are x 0.9. Specimens have been coated with ammonium chloride before photography. Arrows showing the beginning of the body chamber.) / Fig.1 - Pseudopallasiceras aff. pouzinensis (Toucas,1890) dalla sezione del Col Santino (M.Pasubio, Rovereto), n.inv. P221A. Parte bassa della Zona a Fallauxi; fig.2 - Pseudopallasiceras nov.sp.1 dalla sezione del Col Santino (M.Pasubio, Rovereto), n.inv. P214A. Zona a Semiforme/Verruciferum; fig.3 - Pseudopallasiceras aff. guembeli (Zeiss 1968) dalla sezione Bus de Pissavacca (Lavarone, Trento), n.inv. BPV384. Parte bassa della Zona a Semiforme/Verruciferum; fig.4A, B - Silicisphinctes gregorioi (Del Campana, 1905) dalla sezione Bus de Pissavacca (Lavarone, Trento), n.inv. BPV244. Tetto della Zona a Beckeri/Pressulum; fig. 5A,B - Pseudosubplanitoides apenninicum (Cecca, 1990) dalla sezione di Monte Rust (Lavarone, Trento), n.inv.ME735. Zona ad Albertinum. (Tutte le figure sono x 0.9. Gli esemplari sono stati trattati con cloruro di ammonio prima di essere fotografati. Una freccia indica l'inizio della camera d'abitazione.)*

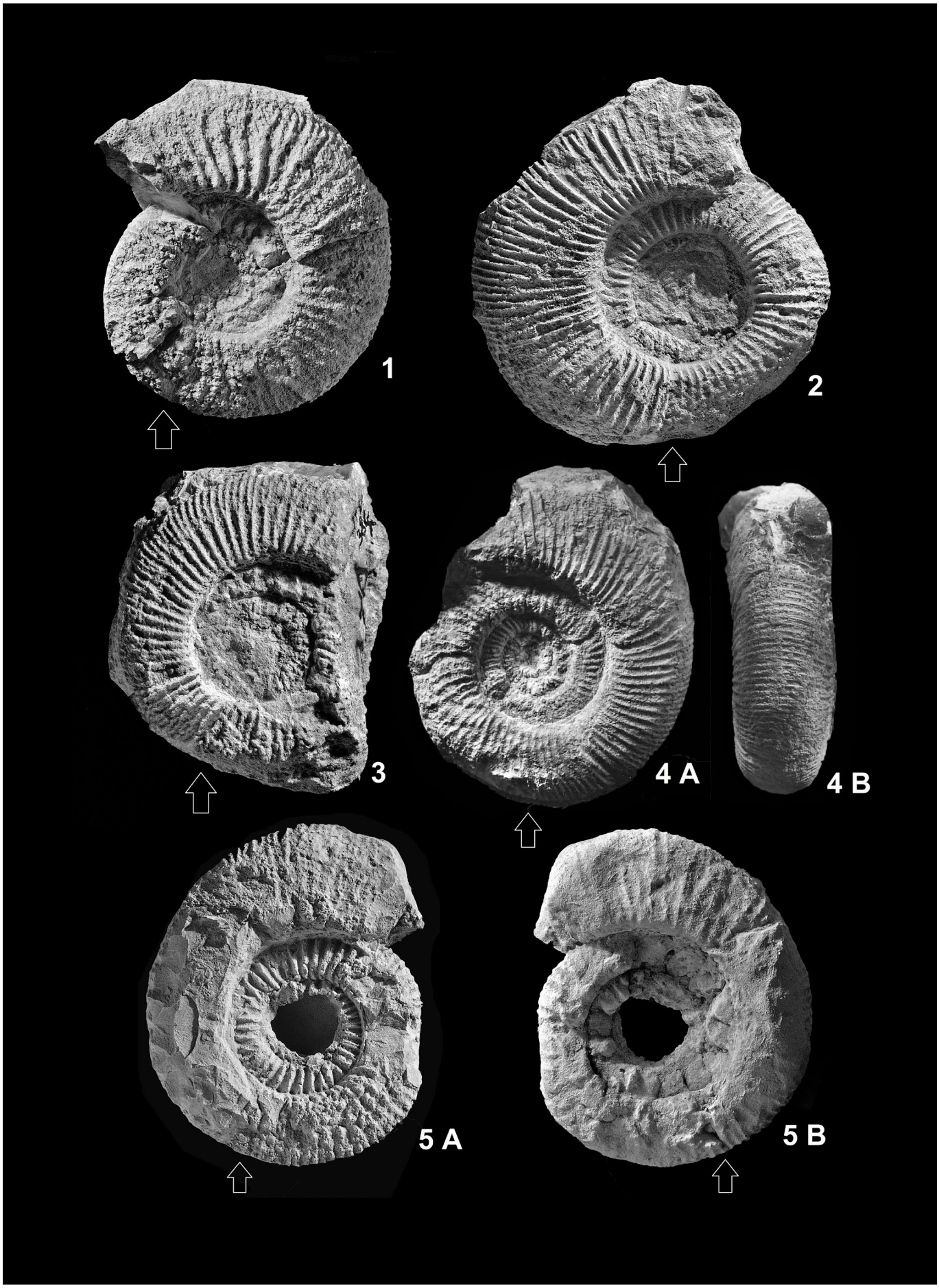
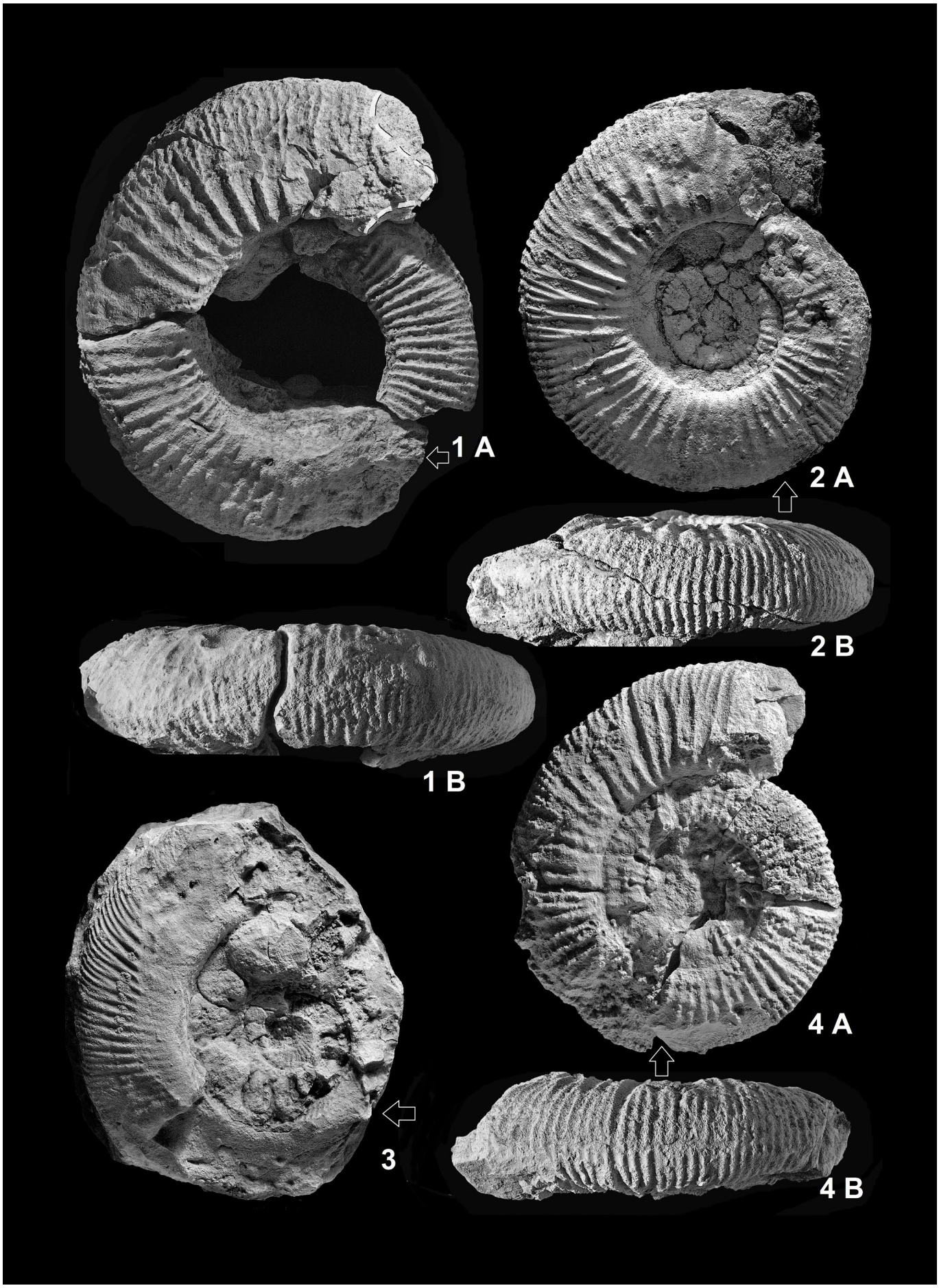

1
2
3
4 A
4 B
5 A
5 B

Plate 7 *- Fig.1A, B - Pseudosubplanitoides aff. appenninicum (Cecca, 1990) from Ex Comando Austriaco section (Virti, Trento), inv.n.V270-130. Top of the Hybonotum Zone near the boundary Hybonotum/Albertinum Zone; fig.2A,B - Pseudosubplanitoides spindelense (Zeiss 1968) from Cortese quarry near Asiago (Vicenza), inv.n. A386C-3. Lower Albertinum Zone; fig.3 - Pseudosubplanitoides schwertschlageri (Zeiss, 1968) from Monte Rust section (Lavarone, Trento), inv.n. MR255. Upper Albertinum Zone; fig. 4A,B - Pseudosubplanitoides sp. from Monte Rust section (Lavarone, Trento), inv.n. MR276. Top Hybonotum Zone. (All figures are x 0.9. Specimens have been coated with ammonium chloride before photography. Arrows showing the beginning of the body chamber.) / Fig.1A, B - Pseudosubplanitoides aff. appenninicum (Cecca, 1990) dalla sezione dell' Ex Comando Austriaco (Virti, Trento), n.inv.V270-130. Tetto della Zona a Hybonotum vicino al limite Hybonotum/ Albertinum; fig.2A,B - Pseudosubplanitoides spindelense (Zeiss 1968) dalla sezione di Cava Cortese (Asiago,Vicenza), n.inv. A386C-3. Parte bassa della Zona ad Albertinum; fig.3 - Pseudosubplanitoides schwertschlageri (Zeiss, 1968) dalla sezione di Monte Rust (Lavarone, Trento), n.inv. MR255. Parte alta Zona ad Albertinum; fig. 4A,B - Pseudosubplanitoides sp. dalla sezione del Monte Rust (Lavarone, Trento), n.inv. MR276. Tetto Zona a Hybonotum. (Tutte le figure sono a x 0.9. Gli esemplari sono stati trattati con cloruro di ammonio prima di essere fotografati. Una freccia indica l'inizio della camera d'abitazione.)*


1 A
2 A
2 B
1 B
4 A
3
4 B