

**New data on the fauna of Clausiliidae of Greece, in particular on  
Albinaria from Attica and the Peloponnese  
(Gastropoda Pulmonata: Clausiliidae)**

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Initiated by a short nomenclatural note of H. Nordsieck (1995) an attempt is made to supply more information on the confusing nomenclatural problems which arose from different interpretation of the specific names *grisea* Deshayes and *maculosa* Deshayes as used by the most important authors in the last century. A table is added summarizing the use of this names to facilitate the understanding of the publications of these authors. The polytypic species hitherto known as *Albinaria hohorsti* H. Nordsieck, 1984, has to bear the oldest group name available which is *Clausilia bigibbosula* Westerlund, 1878. The following taxa are described as new to science: *Albinaria grisea micromaculata*, *Albinaria litoraria*, *Albinaria mixta inflexa*, *Albinaria argynnis geraniensis*, *Albinaria solicola solicola*, and *Albinaria solicola leonidiae*. Lectotypes for the following taxa are designated: *Clausilia grisea* Deshayes, *Clausilia (Albinaria) heterochroa* Westerlund, *Clausilia (Albinaria) heterochroa* f. *wernerii* Sturany, *Clausilia argynnis* Westerlund. Arguments are presented for the grouping of *Albinaria* species from Attica and the Peloponnese. The most common species in the area is *Albinaria grisea*, which is here considered to encompass five subspecies. Several conchologically stable forms are described which probably are the result of hybridization of *A. grisea* ssp. with species living nearby. Probable hybridization zones with related species are located, intermediate forms are illustrated.

Key words: Gastropoda, Pulmonata, Clausiliidae, *Albinaria*, taxonomy, Greece, Attica, Peloponnese.

## INTRODUCTION

The Clausiliidae, in particular the genus *Albinaria* von Vest, 1864, exhibit a remarkable diversity throughout the eastern Mediterranean region. Although the interest of many malacologists focused on this family since the early years of the last century, new taxa are still to be discovered in this area today. This is mainly caused by the tendency of several of the genera involved to split up into local forms with highly restricted areas of distribution. It is also furthered by geological and geographical factors like various substrata or extreme variation in habitat structures within a few kilometres.

One of the most common *Albinaria* species in the central to eastern Peloponnese and the neighbouring areas like Attica is *A. grisea* (Deshayes, 1833). This polytypic species is very often misidentified and confused with forms of other closely related *Albinaria* species which makes it necessary to split this work into a part on nomenclature and another one dealing with questions of systematics. Additionally, a conchological approach is attempted again to provide clear definitions of species and subspecies. A compilation of revised material is given and maps are supplied illustrating the distribution of the taxa in the area under discussion.

## MATERIAL AND METHODS

Traditionally, several technical terms were used for describing details of the clausilial apparatus derived from publications of German students of Clausiliidae. Some of these structures, however, are supposed to be homologous to the apertural dentition of the Pupilloidea. As a consequence, several scientists started to use the terms 'columellaris' for 'lower lamella' (Unterlamelle) and 'angularis' for 'upper lamella' (Oberlamelle). Although this is correct, the author prefers to use the more traditional names here.

The investigation presented here is mainly based on the material collected by the author during several travels to Greece and the collection of the Forschungsinstitut und Naturmuseum Senckenberg in Frankfurt/Main. Material from several private collections is added.

## Collections:

GNM = Göteborgs Naturhistoriska Museum

MNHNP = Musé National d'Histoire Naturelle Paris

NEUB = private collection E. Neubert

NMNH = National Museum of Natural History Leiden

NMW = Naturhistorisches Museum Wien

NORDS = private collection H. Nordsieck

SMF = Senckenberg Museum Frankfurt/Main

SUB = private collection P. Subai

Abbreviations: D = diameter; H = height; PD = diameter of peristome; PH = height of peristome; W = number of whorls; rkm = road kilometre.

## NOMENCLATURE

One of the first to describe terrestrial molluscs from Greece was Deshayes in St. Bory de Vincent, who reported about the scientific results of an expedition to the Peloponnese. In his part, Deshayes described and/or figured four species of Clausiliidae and one species of the Buliminidae. Recently, most of the original material of Deshayes was rediscovered by Dr. Ph. Bouchet in the collection of the École des Mines (Paris) and transferred to the MNHNP (pers. comm. Bouchet, 1996). The syntypes of the taxa described by Deshayes in 1833 had been checked by H. Nordsieck, who published about the nomenclatural consequences of this investigation in 1995.

A short review of the extremely confusing situation following Deshayes' work is given here to facilitate understanding of the problematic use of the taxa *Clausilia maculosa* and *C. grisea*.

Deshayes described several details of the shells, but unfortunately, most of these are not that important or refer to intraspecific variation. The nomenclature and homology of single features of the clausilial apparatus were not yet defined. As a result, one only can assume which lamella or fold he actually described. In his *C. maculosa* for example, he described the aperture as 'tridentata', which is the case in most of the Clausiliidae (upper and lower lamella, subcolumellaris). In *C. grisea* he also noted, that there may be another 'fold' diverging from the lower lamella. This is no fold but the inner rim of the columella which is often somewhat callous and thus seems to be bifurcate. A few years later (1838), Deshayes changed parts of the description of his species focusing even more on the morphology of the columellar folds and callosities and thus producing the base for misinterpretation.

In 1839, Roth published the results of his expedition in the eastern Mediterranean region and reports and figures what he subsequently believed to be *C. grisea* Deshayes (pp. 21-22, pl. 2 fig. 6). It is evident from both text and figure that he dealt with a mixture of both, *A. bigibbosula* and true *A. grisea* (in the sense they are used today). On p. 22, he describes two palatal pliculae to be found as a variation within the specimens of his collection, a character, which can often be found in *A. bigibbosula* subspecies but never in the true *A. grisea*. Roth cites Deshayes supposing that he also found two palatal folds in his *C. grisea*. Fact is, that Deshayes in 1833 wrote 'on voit deux gros plis sur la columelle' which then was obviously misunderstood by Roth. Moreover, Roth's magnified figure (pl. 2 fig. 6) shows a last whorl with flat-topped and evenly wide-spaced riblets as is characteristic for *A. bigibbosula* and never found in the true *A. grisea*. The description of these characters in some specimens proves, that he dealt at least with two species.

Roth's mistake from 1839 was followed up by Pfeiffer (1848: 457), who had problems to recognize *A. grisea* from the description of the original author and thus refers to Roth concerning the variation within this species. Bourguignat (1853: 48) identified without any comment *C. grisea* sensu Roth with *C. maculosa* Deshayes and records *C. grisea* Deshayes from Athens (correct) and Sparta (confusion with *A. g. immensa* (O. Boettger, 1889)<sup>2</sup>). At the same time, Charpentier (1852: 371) in his work on *Clausilia* differentiates between *C. grisea* (he had original material from Deshayes) and a var.  $\beta$ . In the variation, he finds among other characters two palatal folds which makes it evident, that he also had specimens of the true *A. bigibbosula*. Küster's *C. grisea* (1852: 81, pl. 9 figs. 1-4) was later recognised by O. Boettger (1878) to represent *C. schuchii* Rossmässler. This point of view can be followed as Küster's figure 1 clearly shows the prominent subcolumellaris of this species which is characteristic of *A. schuchii*.

Roth himself recognised his mistake in 1855 when reporting about his second trip to the Orient. Now, he erroneously attributed the name *C. maculosa* Deshayes to the species in which the second palatalis is missing and persists in using the name *C. grisea* for the species displaying this fold. This confusion could not be clarified by Martens (1872: 43), who still used the name *C. grisea* in Roth's sense. It is worth noting, that he mentions Nauplia (= Nafplion), where this species was collected by E. Raymond (the original lot is still housed in SMF).

The whole situation was re-investigated by O. Boettger in 1878. He was the first who clearly described the taxa involved and who gave exact definitions of character states. He was the first to understand that the position of the lunella relative to the aperture and presence or absence of a basalis were useful criteria for species discrimination in this group. He points out, that there are specimens which seem to be intermediate but always can be separated by these characters (1878: 141). This point of view could be reconfirmed completely by the investigation presented here. Unfortunately, O. Boettger had no opportunity to check the original material of Deshayes. Otherwise he would easily have recognized the misinterpretation of preceding authors, in particular Roth.

Fact is, that *C. maculosa* Deshayes was three years later described by Rossmässler under the name *Clausilia schuchii* from Greece. This is here proven by the illustration of the types of both taxa. The problem arises, that *C. maculosa* Deshayes pre-dates *C. schuchii* Rossmässler and thus, according to the rule of priority, *C. schuchii* is a junior synonym of *C. maculosa*. As outlined before, the name *C. maculosa* was frequently and erroneously used. Although the author supports the consequent use of the rule of priority, it seems to be useful to suppress the older name *C. maculosa* in favour of *C. schuchii* to stabilize nomenclature. A proposal to be forwarded to the ICZN is in

preparation (Nordsieck & Neubert).

Finally, Roth used the name *C. grisea* Deshayes for a species which is now known as *A. bigibbosula*, and *C. maculosa* Deshayes for the true *A. grisea*. This use was adopted by all subsequent authors. The oldest available name for the *A. hohorsti*-group seems to be *A. bigibbosula* Westerlund 1878. The material of Westerlund was checked by O. Boettger when revising *Albinaria*. He relegated *A. grisea* var. *bigibbosula* into the synonymy of his *C. grisea* sensu Roth, i.e. the species with more dorsal lunellar, the basalis and sometimes a upper palatalis (O. Boettger 1878: 137). Although it was not possible to trace syntype material in Westerlund's collection, the authority of O. Boettger is here accepted. The material of his collection housed in the Senckenberg Museum proves that he interpreted *A. bigibbosula* as *A. grisea*. Most of his material originated from Nafplion, a few others from Eleusis (? SMF 68887 = *grisea grisea*), Attica (fide Roth and Westerlund, probably confusion of labels) and Athens (coll. Rossmässler ex Waltl, obviously lost). For this reason, the taxon hitherto known as *A. hohorsti neglecta* Fauer, 1993, will be the nominate subspecies of *A. bigibbosula*.

The situation can be summarised as follows:

- *A. grisea* Deshayes, 1833 = *A. maculosa* sensu auctores
- *A. schuchii* Rossmässler, 1836 = *A. maculosa* Deshayes, 1833 = *A. grisea* sensu Küster, 1852
- *A. bigibbosula* Westerlund, 1878 = *A. grisea* sensu auctores = *A. hohorsti neglecta* Fauer, 1993

It has to be noted, that Deshayes (1833) wrote under *C. maculosa* 'cette espèce se trouve avec les précédentes' which has to be interpreted as the type locality of *C. caerulea* '...le marbre des Paros...'. This must be erroneous, as *A. schuchii* (= *C. maculosa* Deshayes) is only known from the western Peloponnese and never was found in Paros.

Next to the taxa discussed, Deshayes described *C. caerulea* on p. 166 (pl. 19 figs. 64-66). The type material of this well known species is most probably lost (pers. comm. P. Bouchet).

As a curiosity is has to be mentioned, that the text for the species figured on this plate under nos. 61-63 is missing. This taxon was described later by Charpentier (1852: 401) under the name *C. bourguignati* (= *Idyla bicristata bourguignati*) (Roth, 1855: 43; pers. comm. H. Nordsieck).

Taxon	Deshayes 1833	Deshayes 1838	Roth 1839	Pfeiffer 1848	Küster 1852	Charpentier 1852	Bourguignat 1853	Roth 1855	Martens 1872	Boettger 1878
<i>grisea</i>	<i>grisea</i>	<i>grisea</i>	<i>grisea</i>	/	<i>maculosa</i>	<i>grisea</i>	<i>grisea</i>	<i>maculosa</i>	/	<i>maculosa</i>
( <i>maculosa</i> )/ <i>schuchii</i>	<i>maculosa</i>	<i>maculosa</i>	/	<i>maculosa</i> & <i>schuchii</i>	<i>grisea</i> / <i>schuchii</i>	<i>maculosa</i> / <i>schuchii</i>	<i>maculosa</i>	/ ( <i>massenae</i> )	<i>maculosa</i> /	<i>schuchii</i>
<i>bigibbosula</i>	/	/	<i>grisea</i>	<i>grisea</i>	/	var. $\beta$	<i>maculosa</i>	<i>grisea</i>	<i>grisea</i>	<i>grisea</i>

Table 1. Use of the names *Clausilia maculosa* and *C. grisea* by the most important authors in the period Deshayes to O. Boettger and their most probable identification with taxa as known today. The column under taxon contains the extant valid names, the column under the author reflects the name used by him for this species. / = not mentioned by the author.

*Albinaria schuchii schuchii* (Rossmässler, 1836) (figs. 1-4)

1833 *Clausilia maculosa* Deshayes in Bory de St. Vincent, Exp. Morée: 167, pl. 19, figs. 67-69 [Morée]

1836 *Clausilia schuchii* Rossmässler, Iconographie 1 (1/4): 13, pl. 18, fig. 253.

1838 *Clausilia massenae* Potiez & Michaud, Galerie des mollusques, ...: 185, pl. 19 figs. 3-4 [La Morée, Navarin].

1878 *Clausilia schuchi* var. *tumida* O. Boettger, Novitates Conchologicae 1. Abt. (5): 141 [Cefalonia (= Kephallinia, err.)].

Type material. — *Clausilia schuchii*: Lectotype SMF 4557/1.

Measurements (illustrated specimen *C. maculosa* MNHNP ex coll. Deshayes). — H = 16.15; D = 4.1; PH = 4.1; PD = 3.3; W = 11.5. Lectotype *schuchii*: H = 12; D = 3.3; PH = 2.85; PD = 2.2; W = 9.

The original lot of *C. maculosa* is stored in the MNHNP. It contains 28 specimens, which had been glued to two strips of paper. The text on both strips reads '*C. maculosa*, Desh., Morée'.

## SYSTEMATICS

*Albinaria grisea* (Deshayes, 1833)

The distribution of this species covers Attica, the north-eastern, central and south-eastern part of the Peloponnese. It exhibits no extraordinary characters, thus making it difficult to define its differences to other *Albinaria* species which explains the confusion discussed above in detail. It is split into several subspecies which will be more precisely defined here. In particular, the discrimination between *A. grisea* and *A. bigibbosula* is one of the major problems in areas where both species occur sympatrically. They can be separated by the construction of their lunella, which has always a basalis in *A. bigibbosula*. In *A. grisea*, the lunella is simply curved backwards, a basalis is always lacking. This character state is very homogeneous in all lots hitherto investigated. It should be stressed, that in populations of *A. bigibbosula bigibbosula*, the basalis may be considerably reduced, but a basal callus broadening of the lunella is always left, at least. With the help of this character, all doubtful specimens can be assigned to either *A. grisea* or *A. bigibbosula*. Another character set is displayed by the position of the lunellar relative to the aperture but should only be used in larger lots and always compared to 'standard specimens' of each species. Usually, it is situated somewhat deeper in the aperture in *A. grisea* than in *A. bigibbosula*, and the dorsal keel is always less pronounced compared to what is observed in this species.

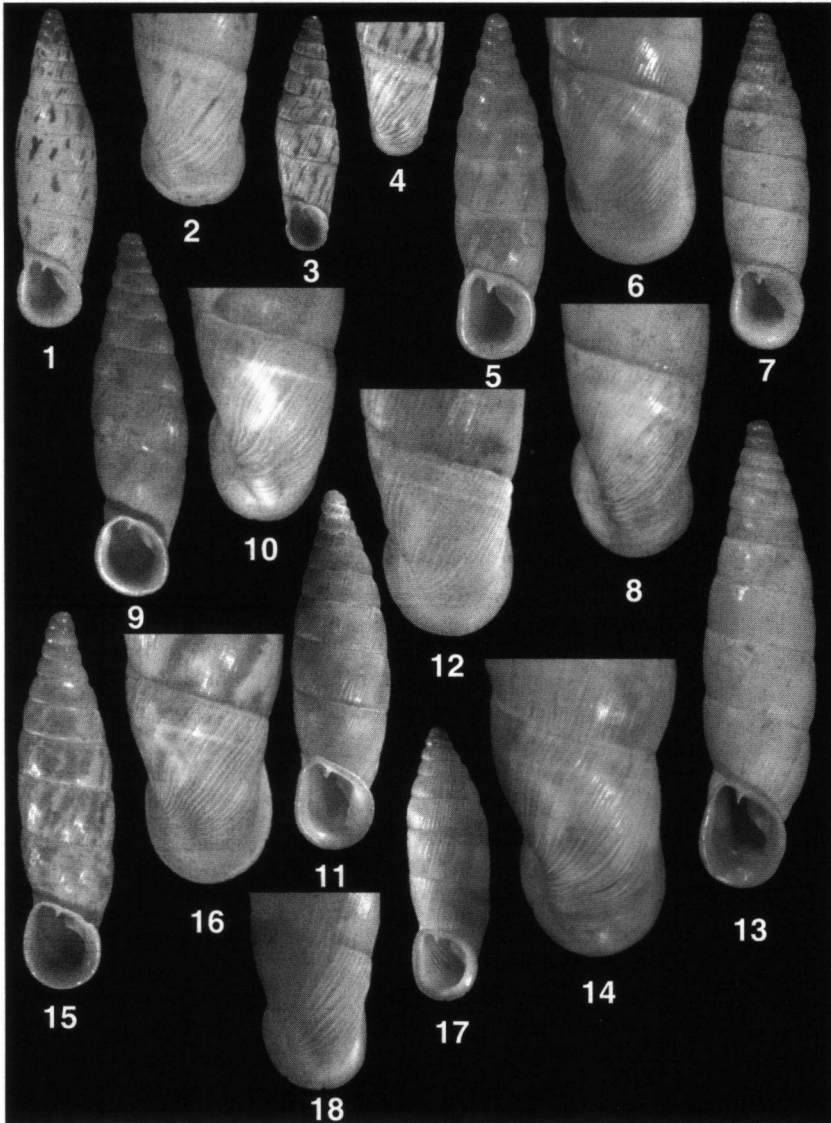
*Albinaria grisea grisea* (Deshayes, 1833) (figs. 5-8, 19)

1833 *Clausilia grisea* Deshayes in Bory de St. Vincent, Exp. Morée: 168, pl. 19 figs. 52-54.

1878 *Clausilia maculosa* var. *thiessaana* O. Boettger, Novitates Conchologicae 1. Abt. (5): 139 [Aus der Umgebung von Patras].

Locus typicus. — Morée.

Type material. — The type lot of *Clausilia grisea* is stored in the MNHNP. It consists of seven specimens and two small strips where the specimens originally had been glued upon. Eight brighter zones can be observed on the strips, so it is possible that the eighth



Figs. 1-18. Shells of *Albinaria* species; all figures are x 3 (frontal view) and x 5 (dorsal or lateral view). 1-4. *Albinaria schuchii*. 1-2, *Clausilia maculosa*, specimen from the Deshayes collection (MNHN); 3-4, lectotype of *Clausilia schuchii* (SMF 4557/1). 5-8. *Albinaria grisea grisea*. 5-6, lectotype of *Clausilia grisea* (MNHN); 7-8, lectotype of *Clausilia maculosa* var. *thiesseana* (SMF 68897). 9-12. *Albinaria grisea heterochroa*. 9-10, lectotype of *Clausilia (Albinaria) heterochroa* (GNM 3051); 11-12, lectotype of *Clausilia (Albinaria) heterochroa* f. *weneri* (NMW 34746). 13-14. *Albinaria grisea immensa*, holotype of *Clausilia maculosa* var. *immensa* (SMF 68899). 15-16. *Albinaria grisea micromaculata* n. ssp., holotype (SMF 311500). 17-18. *Albinaria grisea akrocurta*, holotype (NMNH 56882).

syntype is lost. The text on the strips reads '*C. grisea* Desh., Moreé'. To stabilize nomenclature, a lectotype is selected here which is close to the figure and description given by Deshayes.

SMF 68897 (= lectotype *Clausilia maculosa* var. *thiesseana*), SMF68898/2 (= paralectotypes *Clausilia maculosa* var. *thiesseana*).

Description (according to the lectotype and the paralectotypes). — The somewhat ventricose shell is basically creamy coloured with irregular brownish axial flames. The protoconch consists of 2.5 broad and smooth whorls. The initial three teleoconch whorls display coarse ribs, which become much finer on the following whorls. On the lower whorls, the ribs are faint, the surface of the shell is nearly smooth to the naked eye. On the last third of the last whorl, the ribs are stronger again. On the cervix, the basal keel is shallow, a dorsal keel is hardly present. There is a shallow furrow indicating the boundary between both keels.

The aperture is wide and subrectangular. The peristome is porcellaneous white, somewhat strengthened by a lip and broadly reflected. The spiralis overlaps the upper lamella. The lunellar is dorsal to dorsolateral consisting of a strong and evenly recurved lunella and the principalis. Even in an oblique view into the aperture, the lunella is not completely visible. The lower lamella is broad and subtruncate. It diverges from the rim of the columella. Often, the space in between the rim and the lamella is deeply excavated. The subcolumellaris does not reach the apertural rim.

Measurements. — Lectotype *Clausilia grisea*: H = 17.6; D = 4.75; PH = 5.1; PD = 4; W = 10.25. Lectotype *Clausilia maculosa* var. *thiesseana*: H = 17.25; D = 4.5; PH = 4.7; PD = 3.7; W = 10.25.

Material. — VIOTIA: Euboea, coll. v. Moellendorff; SMF 68890/6, Euböa, Chalkis, coll. O. Boettger ex Blanc; SMF 230296/2, Boeotia, coll. Kaltenbach ex Linnaea; SMF 68884/5, Boeotia, Schimatari, coll. O. Boettger ex Thiesse. ATTICA: 4 rkm E. road branching Trahea to Poros, 12.7.1996, leg. & coll. NEUB; Methana, rocks 500 m before the entrance of the village, 12.7.1996, leg. & coll. NEUB; Varkiza, at the beach camping site, 20.7.1979, leg. & coll. SUB; Oros Parnitha N. of Athens, western part of the panorama road at 1.000 m alt., 21.4.1988, leg. & coll. SUB; Athens, mountain Hymettos towards Athens, 2.4.1988, leg. & coll. SUB; Athens, mountain Hymettos, N. slope, 4.4.1986, leg. & coll. SUB; 4 km NE. of Pendéli, Pentelikon mountains, western slope, 700 m alt., crystalline rocks, 2.5.1991, leg. & coll. SUB; Vouliagmeni, opposite to the island of Fleves, 19.7.1979, leg. & coll. SUB; 3 km from Vari in direction to Koropi, 20.7.1979, leg. & coll. SUB; Monastery Ag. Ierotheos W. of Megara, on limestone, 7.7.1979, leg. & coll. SUB; SMF 68865/4, Attika, coll. Rossmässler ex Roth; SMF 68867, Attika, coll. O. Boettger, ex Dohrn ex L. Pfeiffer (= fig. 1521 in Zilch, 1960); SMF 68868/3, Attika, coll. Kobelt; SMF 68866/3, do., coll. Knobbe ex Landauer; SMF 93767/3, Attika, 1883, coll. Jetschin ex Krüper; SMF 68895, Attika, coll. Reinhardt ex v. Oertzen; SMF 199252/6, old marble quarry at the Pentelikon, 1958, coll. S. H. Jaeckel ex Jaeckel & Plate; SMF 68883/4, monte Penteliko, coll. O. Boettger; SMF 68875/2, Marcopulo, coll. O. Boettger, ex Blanc; SMF 68874/4, Mons Parnes, coll. O. Boettger, ex Neumayr; SMF 93766/2, Attika, Parnes, Chasia, 1883, coll. Jetschin ex Th. Krüper; SMF 230292/5, Eleusis, coll. Kobelt ex Godet; SMF 93751/5, Pentelikon, on the way to the summit, 1926, coll. K. L. Pfeiffer; SMF 93754/4, Soros close to Marathon, 1926, coll. K. L. Pfeiffer; SMF 93749, Tatoi, 1926, coll. K. L. Pfeiffer; SMF 93753/7, mountains W. of Pentelikon close to Marathon, 19126, coll. K. L. Pfeiffer; SMF 93752/3, Pentelikon alongside the road Athens to Marathon, 1926, coll. K. L. Pfeiffer; SMF 93730, Pentelikon, Monastery Penteli, 1926, coll. K.

L. Pfeiffer; SMF 93764/3, Penteli, coll. Jetschin ex Krüper; SMF 93771/3, Piraeus, 1883, coll. Jetschin ex Krüper; SMF 68887, Eleusis, coll. O. Boettger ex Thiesse; SMF 93758, road Eleusis to Megara, gorge close Daphne, 1926, coll. K. L. Pfeiffer; SMF 93757/3, road Eleusis to Megara, close to Megara, 1926, coll. K. L. Pfeiffer; SMF 93773/5, road Eleusis to Thiva, mountains at Mandhra, 1936, coll. K. L. Pfeiffer; SMF 93774/2, road Eleusis to Thiva, before pass after Mazi (?), 1936, coll. K. L. Pfeiffer; SMF 93775/10, road Eleusis to Thiva, behind pass after Mazi (?), 1936, coll. K. L. Pfeiffer; SMF 93776/2, pass over the Kythairon mountains [road Eleusis to Thiva], 1936, coll. K. L. Pfeiffer; SMF 68873/2, Aegina, coll. O. Boettger ex Roth; SMF 93748/3, Hymettos, 1926, coll. K. L. Pfeiffer; SMF 93755/10, Hymettos, alongside the road to Sunion, 1926, coll. K. L. Pfeiffer; SMF 93769/7, Hymettos, 1881, coll. Jetschin ex Krüper; SMF 68893, do., ex O. v. Moellendorff; SMF 68882/2, Hymettos close to Athens, 1883, coll. O. Boettger ex Brenske; SMF 32476/2, Hymettos, coll. Ehrmann ex Schlüter; SMF 93759/61, Attika, Hymettos, coll. Th. Krüper; SMF 93765, Turkovuni close to Athens, coll. Th. Krüper; SMF 93756/13, alongside the road from Athens to Sunion close to Keratia, 1926, coll. K. L. Pfeiffer; SMF 93760/46, Poros, coll. Th. Krüper; SMF 93770/5, Poros, 1883, coll. K. L. Pfeiffer ex Jetschin ex Krüper; SMF 230294/4, Poros, coll. Bosch ex Rolle ex Krüper; SMF 68891/4, Island of Poros, 1890, coll. Nägele ex Krüper; SMF 93777/6, Island of Poros, N. coast of Argolis, coll. K. L. Pfeiffer ex C. R. Boettger; SMF 68888/8, Island of Poros, coll. O. Boettger ex Krüper; SMF 68889/2, mountains opposite Poros, coll. O. Boettger ex Krüper; SMF 93762/4, mountains opposite Poros, coll. K. L. Pfeiffer ex Jetschin ex Krüper. KORINTHIA: SMF 68881/4, Korinthos, coll. O. Boettger ex Thiesse; SMF 68877/2, Lutraki, coll. O. Boettger; SMF 68813/1, Korinthos, coll. Crysser; SMF 93772/8, pass on the road Korinthos to Argos, 1926, coll. K. L. Pfeiffer; Northern Geránia mountains, 4 rkm E. of Pissia to Shinou, 12.7.1996, leg. & coll. NEUB (= SMF 311264/6); antenna station at Mon. Patapiou above Loutraki, 11.7.1996, leg. & coll. NEUB; in the ruins of the old city of Korinthos, 6.8.1976, leg. & coll. SUB; Loutraki, NW. boundary of the city, 7.7.1979, leg. & coll. SUB; slopes of the Geranion mountains above Loutraki, 19.2.1981, leg. & coll. SUB; 14 km from cross-roads Isthmia to Epidavros, 26.10.1997, leg. & coll. NORDS; between Kato Almiri and cross-roads to Sofikó, 26.10.1997, leg. & coll. NORDS. ARGOLIS: SMF 93780/30, ruin of Epidauros, 1926, coll. K. L. Pfeiffer; SMF 199244/3, Epidauros, 1958, coll. S. H. Jaeckel ex Jaeckel & Plate; Arahneo mountains 4 rkm NW. of Metóhi, 15.7.1987, leg. & coll. NEUB (= SMF 311260/10); slope 5 rkm S. of Palaea Epidavros, 23.6.1994, leg. & coll. NEUB; 3 rkm W. Thermisia, 13.7.1996, leg. & coll. NEUB; Didima, pass over mountains 9.5 rkm N. of doline, 13.7.1996, leg. & coll. NEUB; 2 km from Agionori in direction to Limnes, 4.4.1986, leg. & coll. SUB; 3 km from Agionori in direction to Limnes, 4.4.1986, leg. & coll. SUB; 8.5 km from Ag. Vasilios in direction to Argos, 18.7.1979, leg. & coll. SUB; 7 km from the cross-roads at Mon. Agnoundos in direction to Isthmia, 26.10.1997, leg. & coll. NORDS; Ligourion, 4.5 km from cross-roads in direction to Palaea Epidavros, 27.10.1997, leg. & coll. NORDS.

Not identified localities: Western Attica: SMF 68876/6, Palaeokundura, coll. O. Boettger; SMF 96340/6, Palaea Kundura; SMF 68892/3, Mountain Kandili between Megara and Palaeakundura, 1891, coll. O. Boettger ex Krüper; SMF 68815/2. VIOTIA: SMF 93763/3, Böotien, Monte Makoleossos, 1879, coll. K. L. Pfeiffer, ex Jetschin ex Clessin; SMF 68870/2 Boeotien, Macolesso, coll. Kobelt; SMF 68869/6, Boeotien, Macolesso, coll. O. Boettger ex Blanc; SMF 230303/4, Monte Macolossus, coll. Kaltenbach ex Köhler.



The lot 'SMF 93768/8, Chelmos, Hagia Lavra, coll. Th. Krüper' is erroneous and obviously based on a mixing of labels.

*Albinaria grisea heterochroa* (Westerlund, 1894) (figs. 9-12, 19)

1894 *Clausilia* (*Albinaria*) *heterochroa* Westerlund, Nachrichtsbl. dtsh. malakozool. Ges. 26: 176.

1902 *Clausilia* (*Albinaria*) *heterochroa* f. *minor* Sturany, Verh. k. k. zool.-bot. Ges.: 406, fig. 1 [Tripolitza in Arkadien].

1902 *Clausilia* (*Albinaria*) *heterochroa* f. *weneri* Sturany, Verh. k. k. zool.-bot. Ges.: 407, fig. 2 [Zwischen Tripolitza und Sparta (Chani) (Between Tripolitza and Sparta)].

Locus typicus. — In Attica [sic!], bei Stemnica, Chrysomitza und Apana Krepa.

Type material. — *Clausilia heterochroa*: GNM 3051. The type lot ex coll. Westerlund contains 10 specimens. The label reads: '*Cl. heterochroa* (sic!) W., Gr., Arcadia, Stemnitza. Krs.'. A lectotype is herewith designated which matches the description of the original author.

*Clausilia heterochroa* f. *weneri*: NMW 34746. The type lot contained three syntypic specimens. As a lectotype the specimen is selected which compares best the description of the original author. As *C. heterochroa* f. *minor* Sturany simply represents somewhat smaller specimens, a lectotype designation and illustration is not given.

Description. — The shell is medium-sized and less ventricose compared to *A. grisea*

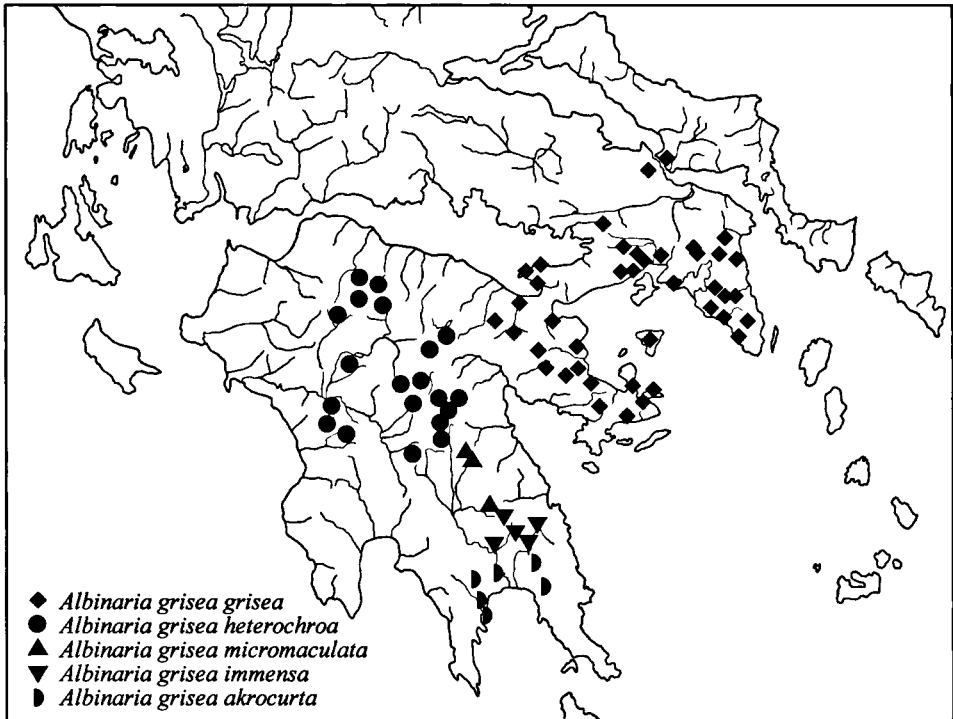


Fig. 19. Distribution of the *Albinaria grisea* group.

*grisea*. Usually, the surface layer is weak to absent which gives the shell an overall brownish appearance. Apical teleoconch whorls with widely spaced riblets which become faint or almost disappear on the medium whorls. On the cervix, they are strongly pronounced, coarser and more widely spaced than in the nominate subspecies. The basal keel is shallow and flat.

Sturany based his f. *weneri* on specimens with somewhat more pronounced ribs on the medium teleoconch. As there are no additional specimens found in all the collections checked, the status of this form remains debatable. As strength and size of interspace between the ribs in *heterochroa* varies to some extent, the author considers this form identical with *heterochroa*. As in many other problems, there is not sufficient material present and thus, the composition of the Clausiliidae fauna of large areas remains unknown.

Measurements (lectotype *heterochroa*). — H = 18.55; D = 5; PH = 4,18; PD = 3,68; W = 10. lectotype *weneri*: H = 18.25; D = 5.05; PH = 5; PD = 4; W = 10.

Material. — ACHAIA: SMF 68817, Kalavrita, 1892, coll. O. Boettger ex Brömme; Aroánia mountains, 10 rkm S. of road branching Kalavrita to Tripolis, 26.6.1987, leg. & coll. NEUB; 4.1 km from the cross-roads Kalavrita/Tripolis/Tripotama in direction to Tripotama, 14.5.1991, leg. & coll. SUB; Metoh, W. von Kalabrita, 1.8.1976, leg. & coll. SUB. ELIS: 2 rkm W. of the ruin of the temple of Vassai, 28.6.1987; 5 rkm W. Andritsena alongside the road to Krestena, 17.7.1987, leg. & coll. NEUB. Elis, 10 rkm S. Sékoulas to Andritsena, 28.6.1987, leg. & coll. NEUB; in the vicinity of the cave N. of Kastria, 14.5.1991, leg. & coll. SUB. ARCADIA: SMF 68821, Vytina, 1900, coll. O. Boettger ex Krüper; SMF199196/2, Lavidí, 800 m, 1958, coll. S. H. Jaeckel ex Jaeckel & Plate; SMF 94003/a/11, pass alongside the road Tripolis to Sparta, 1.500 m alt., 1926, coll. K. L. Pfeiffer; SMF 94003/b/11, pass alongside the road Tripolis to Sparta, 1.500 m alt., 1926, coll. K. L. Pfeiffer; SMF 93999/a/17, Stenmitza, Chrysovitsa, coll. Th. Krüper; SMF 93999/b/17, Stenmitza, Chrysovitsa, coll. Th. Krüper (= Hrissovitsi W. of Tripolis in direction to Dimitsana?); SMF 94000/8, Stenmitza, 1899, coll. Jetschin ex Krüper; SMF 32474/2, Stenmitza, coll. Ehrmann ex Schlüter; SMF 68879/5, Stenmitza, 1892, coll. O. Boettger ex Brömme; SMF 230309/4, Stenmitza, coll. Bosch ex Rolle; SMF 199197/8, Apano Crepa (= monastery Epáno Hrépas N. of Tripolis), coll. S. H. Jaeckel ex Edlauer; SMF 68818/7, Apano Crepa, 1892, coll. O. Boettger ex Brömme; SMF 94001/27, Apano Crepa, coll. Th. Krüper; SMF 230308/4, Apano Crepa, coll. Bosch ex Rolle; SMF 93761/4, Tripolitza, coll. K. L. Pfeiffer ex Jetschin ex O. Boettger; SMF 209281/5, Tripolitza, coll. S. H. Jaeckel; SMF 199195/6, Tripolitza, coll. S. H. Jaeckel; SMF 68894/2, Tripolitza, coll. v. Moellendorff; SMF 93778/9, Tripolitza, 1904, coll. C. R. Boettger; SMF 68872/5, Tripolitza, 1882, coll. Kobelt ex Thiesse; SMF 68810/7, Tripolitza, 1880, coll. O. Boettger ex Thiesse; SMF 209278/7, Tripoli, coll. S. H. Jaeckel; SMF 68814/4, Tripolis, 1902, coll. Nägele ex Leonis; SMF 93718/33, Tripolitza, coll. Th. Krüper; 5 km N. of Lakonian boundary in direction to Sparta, 5.8.1976, leg. & coll. SUB; 4 km from the village of Mandirea in direction to Sparta, 5.8.1976, leg. & coll. SUB; 3 rkm S. of Vouno (S. of Tripolis), eastern shore of Taka lake, 20.4.1988, leg. & coll. SUB; 4.7 km from Levidi in direction to Kandila, on limestone boulders, 720 m alt., 7.5.1991, leg. & coll. SUB; 7 km from Perthóri in direction to the monastery Epáno Hrépas on limestone boulders, 8.5.1991, leg. & coll. SUB; at the monastery Epáno Hrépas, 8.5.1991, leg. & coll. SUB; alongside the road Olympia to Tripolis, 1 km from Stavrodromio, 2.7.1976, leg. & coll. SUB; SE. of Megalopoli, between Páparis and Skortsinos, at the

branching point to Agriakona, 8.5.1991, leg. & coll. SUB. ARGOLIS: pass over the Oliyirtos mountains, 7 km from Kandila in direction to Psári, 1.400-1.500 m alt., FG 28, leg. & coll. SUB (sympatric with *Isabellaria clandestina*)

Not identified localities: SMF 68878, Kardisse, 1900, coll. O. Boettger ex Krüper.

Notes. — There are two lots originating from the Temple of Zeus at Nemea. One of them (SMF 32482/8, Nemea, Temple of Zeus, 24.4.1912, coll. Ehrmann ex Schlüter) contains typical *A. grisea grisea* specimens, while the second one (SMF 230293/4, Nemea, Temple of Zeus, 1912, coll. Bosch) contains *A. g. heterochroa*. The original label in the *A. g. heterochroa* lot gives an additional information: 'Nemea, at the railway station'. Nemea seems to be a very interesting area as three of the taxa discussed here (*A. g. grisea*, *A. g. heterochroa* and *A. bigibbosula*) seem to occur closely together or even show some overlap of their ranges.

The lot 'SE. of Megalopoli, between Páparis and Skortsinos, at the branching point to Agriakona, 8.5.1991, SUB' only contains two small eroded specimens, their identification with *A. g. heterochroa* remains doubtful until more specimens are known from this and neighbouring sites.

*Albinaria grisea immensa* (O. Boettger, 1889) (figs. 13-14, 19)

1889 *Clausilia maculosa* var. *immensa* O. Boettger, Abh. Senckenb. Naturf. Ges. 16: 52.

Locus typicus. — Parnon-Gebirge.

Type material. — Holotype SMF 68899/1.

Description. — A medium-sized to large subspecies of *A. grisea*. The teleoconch is covered by a thick white glossy layer, opaque dots or streaks are absolutely rare compared to other subspecies. The upper teleoconch whorls are sculptured by widely spaced sharp ribs. They fade out very fast, the medium whorls are smooth. The cervix bears coarse and densely spaced ribs similar to *A. g. heterochroa*. Both keels are present, but the dorsal keel is shallow.

The columellar rim is weak, the space towards the lower lamella is only in a few cases as excavated as in *A. grisea*. The lower lamella is narrow and steep.

Measurement (holotype). — H = 24.2; D = 5.9; PH = 6; PD = 4.5; W = 11.

Material. — LAKONIA: pass mountains, pass SE. Kosmás, 6.8.1980, leg. R. Kinzelbach, NEUB; Geraki to Leonidion, approx. 10 rkm E. Geraki close to the pass, 11.7.1987, NEUB; Agios Dimitrios to Geraki, 8 rkm NE. Agios Dimitrios, 11.7.1987, NEUB; 4 rkm SW. of Kremasti, 19.7.1996, NEUB; 4 rkm SW. Vrontamas, bridge over the Eurotas, on limestone slopes at the entrance of the canyon (small pathway to Palaimono Astiro), 20.7.1996, NEUB; 12 rkm N. Geraki, leg. Edlinger, NMW; 10.8 rkm N. Geraki, leg. Edlinger, NMW; Alepochori, 1 km in direction to Agios Dimitrios, 31.11.1997, leg. & coll. NORDS; Alepochori, 3 km in direction to Agios Dimitrios, 31.11.1997, leg. & coll. NORDS. ARCADIA: Leonidion, 3.6 rkm S. Peletá alongside the road to Kremasti, 920 m alt., 19.7.1996, NEUB; Kosmas, 3.5 km in direction to Geraki, 1000 m alt., 30.10.1997, leg. & coll. NORDS.

Note. — It is worth noting, that living specimens of *A. g. immensa* are usually found clinging to steep and open rock faces (own observation, pers. comm. H. Nordsieck). This is in contrast to the other subspecies of *A. grisea*, which usually prefer habitats with more dense vegetation where the animals can be found in rock crevices close or even on the bottom.

***Albinaria grisea micromaculata* n. ssp. (figs. 15-16, 19)**

Locus typicus. — Greece: Peloponnese: Arcadia: Parnon mountains, 5.5 rkm SSE. of Agios Petros, 20.4.1988, leg. P. Subai.

Type material. — Holotype SMF 311500/1. Paratypes NMNH 59063/1, 1 in NEUB, 1 in SUB.

Diagnosis. — A large subspecies of *A. grisea* with the white surface layer interrupted by small dot-like maculations.

Description. — The upper teleoconch whorls are subconical and covered by a few low riblets. The medium to lower whorls are smooth besides some irregularly longitudinal streaks. Only the cervix area between lunellar and aperture displays a set of sharp and regularly spaced ribs. The basal keel is inconspicuous and set apart from the shallow dorsal keel by a fine groove. The complete shell is covered by a white surface layer with opaque axial flames. Often, these flames are dissolved to form clouds of brownish spots.

The lunellar is situated in a dorsolateral position and consists of the principalis and the lunella. The lunella is weaker in its lower part. The lower lamella is narrow and steep.

Measurements (holotype). — H = 19.2; D = 4.5; PH = 5.1; PD = 3.95; W = 10.

Etymology. — The name *micromaculata* is chosen for the cloudy appearance of the axial opaque streaks.

Affinities. — This taxon is close to *A. g. immensa*. Both subspecies have comparatively large shells and a completely white surface layer although *A. g. immensa* is almost always completely white. The ranges of both subspecies seem to meet in the area of Kosmas. The new subspecies differs from *A. g. grisea* in the form of the upper teleoconch whorls which are more tumid in the latter. In *A. g. heterochroa*, size and the rugose cervical ribs of *heterochroa* separate the two subspecies.

Material. — ARCADIA: 5 rkm E. Agios Petros, 20.3.1997, leg. Edlinger, NMW; Kosmas, 4.5 km in direction to Leonidion, 30.10.1997, leg. & coll. NORDS; Kosmas (in direction to Leonidion), 30.10.1997, leg. & coll. NORDS.

*Albinaria grisea akrocurta* Gittenberger, 1994 (figs. 17-19)

1994 *Albinaria grisea akrocurta* Gittenberger, Basteria 58: 61, figs. 5-6.

Locus typicus. — Lakonia, 2 km W. of Niata [= in the hills N. of Molai].

Type material. — Holotype NMNH 56882/1.

Diagnosis. — The thin-walled shell is small and broadly conical. The protoconch is short and blunt. Usually, the teleoconch is ribbed throughout, although specimens with less pronounced ribs can also be found within the populations. The basal keel is present, but the dorsal keel is very shallow to almost lacking.

The peristome is squarish, the lunellar is in dorsal position. There are no major differences in the clausilial apparatus compared to the other subspecies.

Measurements (holotype). — H = 13.9; D = 4.15; PH = 3.64; PD = 3.2; W = 9.

This taxon is also known from '3 km W. of Skala, in a limestone gorge N. of the road' (Gittenberger, 1994).

Material. — LAKONIA: N. Molai, 3 rkm W. of Niata, 19.7.1996, NEUB (SMF 311262/4); Githion, at ruins on the island of Kranai, 4.2.1981, leg. & coll. SUB; 6.5 km from Skala in direction to Githion, 14.7.1979, leg. & coll. SUB; 4 rkm N. of

branching point of the road from Molai, 14.7.1979, leg. & coll. SUB; 3 km from Skala in direction to Sparta, 14.7.1979, leg. & coll. SUB; ca. 10 km NE. of Gythion, 17.8.1973, leg. Fauer, coll. SUB; Krokees, 7.5 km in direction to Skala, 2.11.1997, leg. & coll. NORDS.

*Albinaria bigibbosula bigibbosula* Westerlund, 1878 (figs. 20-21, 43)

1878 *Albinaria grisea* var. *bigibbosula* & var. *minor* Westerlund, Fauna Europ. Moll. Extramar. Prodrumus: 244 [no type locality given].

1993 *Albinaria hohorsti neglecta* Fauer, Arch. Molluskenk. 122: 51, pl. 1 fig. 2 [Peloponnes, Argolithos, Nea Epidavros, 2 km in Richtung Dimena].

Locus typicus. — As Nafplion is the classical locality of *A. grisea* sensu Roth and O. Boettger, this place is here provisionally accepted as type locality.

Type material. — *A. g.* var. *bigibbosula*: No original material could be traced. As not all parts of the Westerlund collection have been checked, the designation of a neotype is postponed.

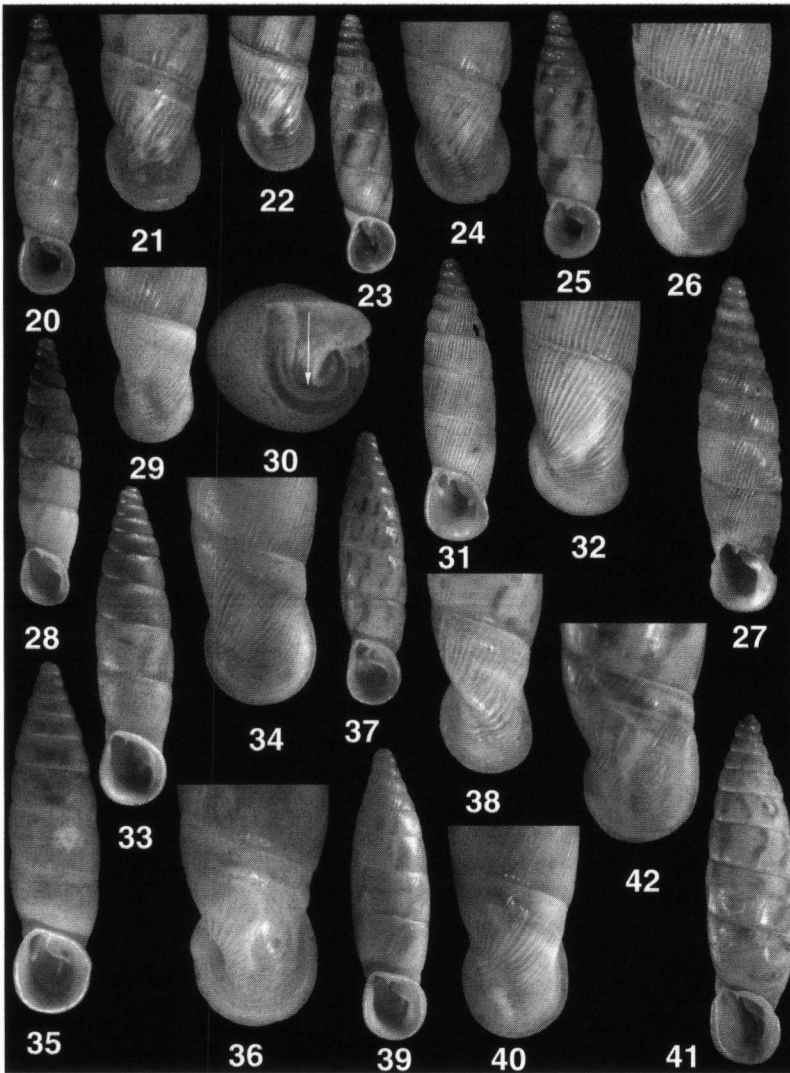
*Albinaria hohorsti neglecta*: Holotype SMF 309225/1.

Description. — The medium-sized shell is subcylindrical to subventricose. The greyish white surface layer sometimes is interrupted by opaque axial flames or dots. Frequently, completely white specimens occur. The upper parts of the teleoconch whorls are covered by fine and evenly spaced ribs. This is in contrast to the medium part of the shell, where the ribs become flat and more widely spaced. On the cervix, the ribs are strong and somewhat rugose. The variation of the form of the basal keel is considerable as it may form a narrow crest to a broad shallow elevation. The dorsal keel in general is flat but always discernible.

The lunellar is situated dorsally. The strong lunella is connected to a basalis which often is reduced to a small callus triangle. Sometimes, a small palatal callus is visible indicating the presence of an upper palatalis. The lower lamella is narrow, steep and frontally subtruncate. The columellar rim is fine and sharp leaving a small excavated area. The subcolumellaris is S-shaped and considerably elongated towards the aperture.

Measurements (holotype *A. h. neglecta*). — H = 15.15; D = 3.55; PH = 3.75; PD = 3.1; W = 10.5.

Material. — KORINTHIA: 1 km S. of Nemea, on limestone boulders, 7.5.1991, leg. & coll. SUB. ARGOLIS: Castle of Mykene, 15.7.1985, leg. & coll. NEUB; do., 23.6.1994, leg. & coll. NEUB; Castle of Mykene and neighbouring valley, 6.8.1976, leg. & coll. SUB; Mykene, in the valley close to the excavation sites, 20.4.1988, leg. & coll. SUB; SMF 93746/5, Mykene, 1926, coll. K. L. Pfeiffer; SMF 32478/11, Mykene, 25.4.1912, coll. Ehrmann ex Schlüter W. of Argos, 2 rkm S. of Kariá, limestone boulders and Macchia, 16.7.1996, leg. & coll. NEUB; Nafplion, Palamidi (= castle of Nafplion), 12.7.1985, leg. & coll. NEUB; do., 23.6.1994, leg. & coll. NEUB; do., 28.10.1997, leg. & coll. NORDS; ruin of Palaeo Asini close to Tolon, 12.7.1987, leg. & coll. NEUB; do., 27.10.1997, leg. & coll. NORDS; Palaea Epidavros, rocky bay 2 rkm N. of Mon. Agnoundos, 13.7.1987, leg. & coll. NEUB; 3 rkm W. of the road branching Nea Epidavros to Dimena, 13.7.1996, leg. & coll. NEUB; Nea Epidavros, 2 km in direction to Dimena, 26.10.1997, leg. & coll. NORDS; Nea Epidavros, close to the cross-roads to the village, 27.10.1997, leg. & coll. NORDS; Castle of Tiryns, 21.8.1973, leg. Fauer, coll. SUB; do., 6.8.1976, leg. & coll. SUB; do., 28.10.1997, leg. & coll. NORDS; village of Kenchrai (= Ellinikon), 18.7.1979, leg. & coll. SUB; SMF



Figs. 20-42. Shells of *Albinaria* species; all figures are  $\times 3$  (frontal view) and  $\times 5$  (dorsal or lateral view). 20-21, *Albinaria bigibbosula bigibbosula*, holotype of *Albinaria hohorsti neglecta* (SMF 309225). 22-23, *Albinaria bigibbosula hohorsti*, holotype (SMF 256147), oblique view to show basalis. 24-25, *Albinaria bigibbosula sibyllae*, holotype (SMF 309228). 26-27, *Albinaria petrosa*, neotype (NMW, without number). 28-30, *Albinaria litoraria* n. sp. 28-29, holotype (SMF 311501); 30, view on the parietum (Paraliá Astros, rocks around the castle, 17.7.1996, NEUB). 31-32, *Albinaria mixta mixta*, holotype (SMF 256239). 33-34, *Albinaria mixta inflexa* n. ssp., holotype (SMF 311507). 35-36, *Albinaria argynnis argynnis*, lectotype *Clausilia argynnis* (GNM 2958). 37-38, *Albinaria argynnis profundella*, holotype (NMNH 56875). 39-40, *Albinaria argynnis levipalatalis*, holotype (NMNH 56872). 41-42, *Albinaria argynnis geraniensis* n. ssp., holotype (SMF 311503).

68805/4, Morea, coll. Rossmässler ex Roth 1856; SMF 93742/26, Tiryns, coll. K. L. Pfeiffer; SMF 93741/49, Nauplia, rocks at a small chapel, coll. K. L. Pfeiffer 1926; SMF 93743/36, Nauplia, coll. Krüper; SMF 68807/1, Nauplia, coll. Reinhardt ex Raymond; SMF 68816/11, Nauplia, coll. Reinhardt ex Heldreich; SMF 68806/8, Nauplia, coll. Kobelt ex Raymond; SMF 68812/2, Morea, coll. Kobelt; SMF 230301/1, Nauplia, coll. Kinkelin; SMF 68809/2, Nauplia, coll. O. Boettger ex Thiesse 1881; SMF 68808/6, Nauplia, coll. O. Boettger ex Thiesse; SMF 93744/4, Nauplia, coll. O. Boettger ex Tauschverein; SMF 68811/6, Nauplia, coll. O. v. Moellendorff; SMF 32477/3, Nauplia, coll. Ehrmann ex Lindholm; SMF 32480/2, Nauplia, coll. Ehrmann ex Schlüter; SMF 230306/5, Nauplia, coll. Kaltenbach ex O. Schmidt ex O. Boettger; SMF 230305/4, Nauplia, coll. Kaltenbach ex A. Köhler; SMF 230304/2, Nauplia, coll. Kaltenbach ex Linnea ex Goldfuss; SMF 199245/2, Nauplia, coll. S. H. Jaeckel (contains 6 specimens); SMF 230302/5, Nauplia, coll. C. Bosch ex H. Rolle; SMF 230299/1, Griechenland (Peloponnese), coll. Heynemann ex Sturm ex Roth; 1 rkm S. of Kiverion in direction to Astros, 17.7.1979, SUB; Kiveri close to Mili, 28.10.1997, leg. & coll. NORDS.

Notes. — This subspecies is the most common form of *A. bigibbosula* in the Argolis and may easily be confused with *A. g. grisea*, *A. g. heterochroa* and *A. petrosa*. In both *A. grisea* subspecies, the lunellar is more dorsolaterally situated, the basalis lacking and the medium teleoconch is almost smooth. Compared to *A. petrosa*, the constant ribbing of the teleoconch of this species clearly differentiates it from any form of *A. bigibbosula*. It is worth noting, that specimens from the western Argolis (Mykene, Kariá) and the northern coast of Arcadia (Kiveri) differ somewhat from the typical form from Nafplion. Here, the ribs of the medium teleoconch become more pronounced in strength and density.

*Albinaria bigibbosula hohorsti* H. Nordsieck, 1984 (figs. 22-23, 43)

1984 *Albinaria hohorsti* H. Nordsieck, Arch. Molluskenk. 114: 199, pl. 12 fig. 10.

Locus typicus. — Tolon at Nafplion.

Type material. — Holotype SMF 256147.

Diagnosis. — The shell is small and has a white surface layer and opaque axial flames. The subapical teleoconch whorls bear coarse ribs, which become considerably finer to almost obsolete on the medium whorls. The cervix has coarse somewhat rugose ribs. Both keels are prominent, of equal size and separated by a broad shallow furrow.

The dorsal lunellar consists of the strong lunella connected to the basalis. Next to the principalis, an upper palatalis is present which splits in a not connected interior and exterior part. The exterior upper palatalis ends in a voluminous palatal callus.

Measurements (holotype). — H = 13.85; D = 3.15; PH = 3.35; PD = 2.65; W = 10.25.

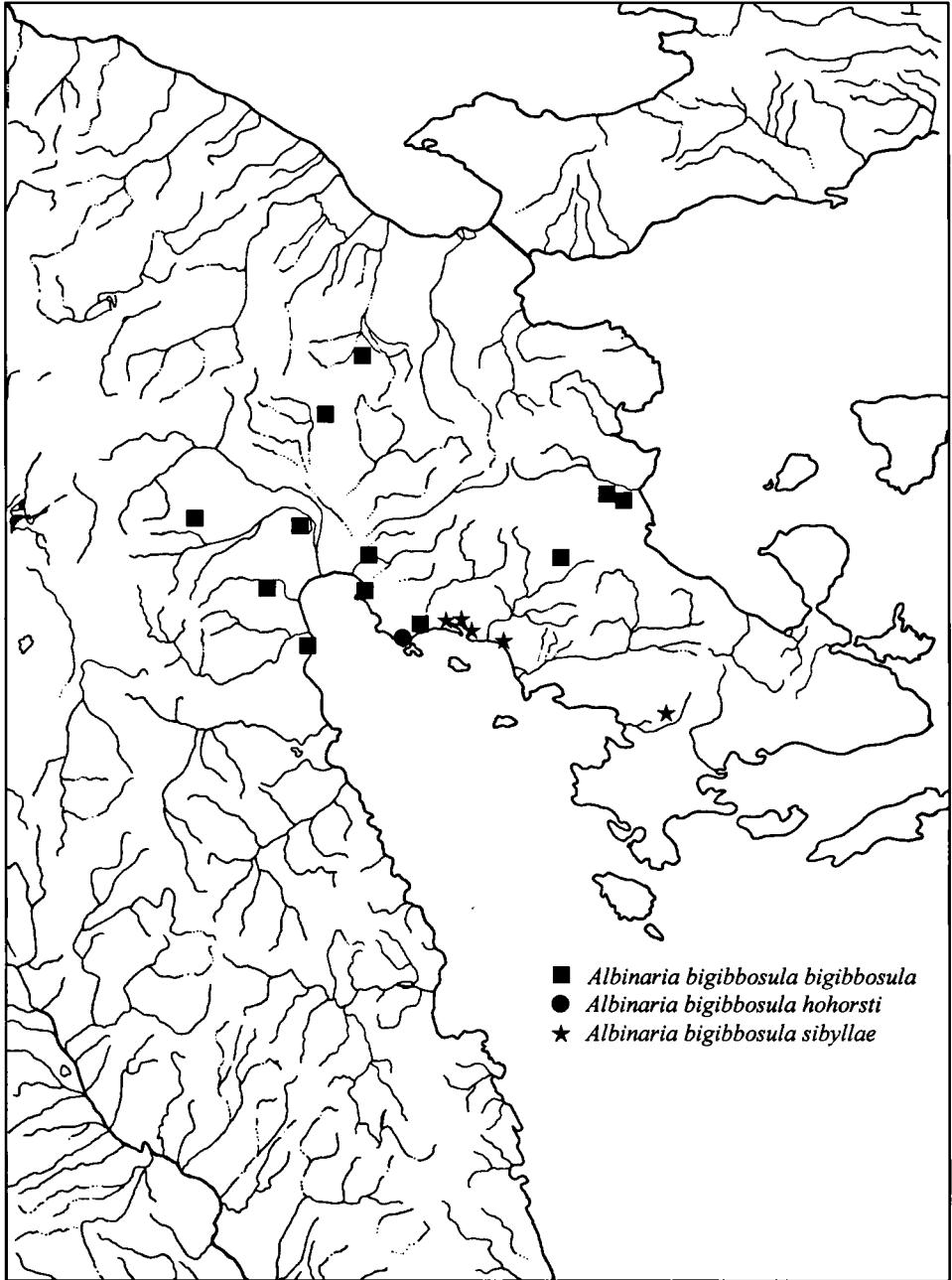
This subspecies seems to be restricted to a small area around the locus typicus. This place is opposite the graveyard of Tolon. This area is supposed to be destroyed by the construction of houses (pers. comm. Prof. Dr. Hohorst).

*Albinaria bigibbosula sibyllae* Fauer, 1993 (figs. 24-25, 43)

1993 *Albinaria hohorsti sibyllae* Fauer, Arch. Molluskenk. 122: 52, pl. 1 fig. 3.

Locus typicus. — Peloponnese, Argolithos, Vivarion at Drepanon, approx. 20 m alt.

Type material. — Holotype SMF 309228.

Fig. 43. Distribution of the *Albinaria bigibbosula* group.



Diagnosis. — This subspecies differs from the nominate form by less prominent ribs of the teleoconch. The exterior part of the upper palatalis is usually present but tends to be reduced. The dorsal keel is extremely shallow.

Measurements. — H = 13.3; D = 3.6; PH = 3.6; PD = 3.05; W = 9.5.

Material. — ARGOLIS: Vivarion close to Drepano, alongside the road in direction to Kandia, 27.10.1997, leg. & coll. NORDS; Kandia at Drepano, 27.10.1997, leg. & coll. NORDS; Didima, rocky slopes around the doline, 13.7.1996, NEUB; Bay of Tolon, limestone boulders 5 rkm W. of Iriá, 16.7.1996, NEUB.

*Albinaria petrosa* (L. Pfeiffer, 1849) (figs. 26-27, 62)

1849 *Clausilia petrosa* L. Pfeiffer, Zeitschr. Malakozool. 5: 122.

Locus typicus. — Graecia.

Type material. — Neotype NMW. The neotype was designated by Paget (1971) from the private collection of Parreyss. He compares the descriptions of *C. petrosa* as given by Pfeiffer in the original description and Küster (1860: 226). Paget does not mention, that the origin of Küster's material is obscure ('aus meiner Sammlung') and that he describes two palatal folds. One of them is the principalis, the second is said to be obsolete and branching off basally from the lunella. In contrast, his figures (pl. 25 figs. 11-13) show a principalis and the exterior part of an upper palatalis. Paget (p. 472) notes, that Küster's description of the upper part of the shell (fine) is not appropriate as the Parreyss specimen has a rounded apex. Summarizing it seems to be quite sure, that Küster's *C. petrosa* is a separate species and that he held no original material. Westerlund's specimen NMW 23.308 (Paget, 1971: pl. 1 fig. 5) is also *A. petrosa*, but the locality Attica is erroneous.

Description.- The thin-walled yellowish to brown shell is slender cylindrical and of medium size. There is no white surface layer or any maculation visible on the teleoconch. The teleoconch whorls are covered by regularly spaced sharp ribs. The distance between the ribs is always constant even in the cervical region. The dorsal keel is very shallow or nearly lacking.

The aperture is oval with a reflected peristome. The position of the lunellar varies between dorsal to dorsolateral. It is close to the lunellar of *A. grisea*, but in the type specimen, a small callus triangle at the basis of the lunella indicates the presence of a basalis. The subcolumellaris is elongate towards the aperture, somewhat excavated or slightly S-shaped leaving a considerable gap to the lower lamella. This lamella is narrow and somewhat thickened frontally.

Measurements (neotype). — H = 18.05; D = 4.4; PH = 4.7; PD = 3.6; W = 11.

Material. — ARGOLIS: SMF 68820/1, Achladokambos, 1900, coll. O. Boettger ex Krüper; 8 km from Achladokambos in direction to Tripolis, 5.8.1976, leg. & coll. SUB; 7 km from Achladokambos in direction to Argos, 4.5.1986, leg. & coll. SUB; 12.5 rkm from Agiorgitika in direction to Argos, in the vicinity of Achladokambos, 4.5.1986, leg. & coll. SUB; 7 km from Achladokambos to Argos, 20.4.1988, leg. & coll. SUB; Mili, 1.5 km N. of cross-roads to Achladokambos, 28.10.1997, leg. & coll. NORDS.

The presence of a basalis could be proven by investigation of almost 100 specimens from the vicinity of Achladokambos ex SUB. Very often, this fold is reduced as in the type specimen, which is similar to what can be seen in *A. bigibbosula*. It differs from this species by lack of the dorsal keel and surface layer and its evenly ribbed teleoconch. Compared to all *A. grisea* subspecies it differs by its mode of ribbing as well as the

position of the lunellar besides *A. g. akrocurta*, which can easily be separated by its stout shape.

***Albinaria litoraria*** n. sp. (figs. 28-30, 62)

Type material. — Holotype SMF 311501/1. Paratypes SMF 311502/2, NMNH 59058/3, NORDS 10392 (73 dry, 10 preserved), 4 in NEUB.

Locus typicus. — Paralía Astros, rocks near the road in direction to Kiveri, 29.10.1997, leg. H. Nordsieck.

Diagnosis. — A completely ribbed species of *Albinaria* which is characterized by the presence of a lamella parallel to the spiralis and situated between spiralis and columella.

Description. — The small to medium-sized shell is white to light corneous brown. In fresh specimens, the teleoconch is covered by a thin whitish layer with a few faint axial maculations. The subapical whorls are somewhat elongated. The surface of the shell is completely covered by evenly spaced rib. In a few specimens, rib density and strength varies to some extent. On the cervix, the ribs become somewhat finer and are closer set than on the upper whorls. The basal keel is small, the dorsal keel is shallow.

The oval to subquadrate aperture has a flared lip, the peristome is somewhat recurved. The lunellar lies dorsal to dorsolateral. Often, the lunella is broadened basally to form a thick triangle. In many specimens, a small basalis can be found protruding from this callus. The narrow lower lamella is somewhat truncate in the aperture with a strengthened rim. The upper lamella is high and usually extraordinarily elongate. In many specimens, this lamella is subdivided with a short to very long interior part which clearly differs in its structure from the upper lamella. It is thickened and often somewhat rugose and irregularly arched (fig. 30). Usually, the subcolumellaris is somewhat arched in its medium part, but straight basally, or evenly curved.

Measurements (holotype). — H = 14.3; D = 3.3; PH = 3.5; PD = 2.6; W = 10.

Affinities. — This species differs by the remarkable form of its upper lamella from other *Albinaria* species. In particular, the homology of this character remains unclear. Although weak, a parallelis is visible in most of the specimens, and the spiralis overlaps the upper lamella as can be seen in many other species of the Clausiliidae. Rugosity and shape of this lamella indicate, that it is not simply an elongation of the upper lamella.

Concerning the form of the lower lamella, the position of the lunellar, the form and degree of reduction of the basalis and form of the keels some similarity with *A. petrosa* exists, but the white layer and maculation is not to be found in any of the *A. petrosa* specimens investigated.

*Albinaria profuga* differs profoundly as in this species the ribs are much coarser, the dorsal keel is much more pronounced, the cervix constricted, the subcolumellaris always straight, a palatal callus is often present, and the lower lamella is a broad and perpendicular plate touching the peristome gently without any interruption.

Material. — ARCADIA: Paralía Astros, rocks around the castle, 17.7.1996, NEUB; open rock faces at the castle of Paralía Astros, 16. 7.1979, leg. & coll. SUB; Paralía Astros, 5 km in direction to Kiveri, 29.10.1997, leg. & coll. NORDS.

Etymology. — From lat. *litorarius* = from the beach. This name is chosen as the name of the type locality Paralía Astros means 'the beach of Astros'.

Notes. — The lot from the castle of Paralía Astros (SUB) contained one specimen of *A. b. bigibbosula*. Conchologically, this specimen is very close to the form living at the castle Palamidi above Nafplion. The southernmost locality known for *A. bigibbosula*

is Kiverion (S. of Argos). As far as known, the area S. of Kiverion is inhabited by *A. profuga*. There are doubts whether this specimen really lived at Paralía Astros or whether it was erroneously mixed into the lot of *A. litoraria* while handling the collection.

*Albinaria mixta mixta* H. Nordsieck, 1984 (figs. 31-32, 62)

1984 *Albinaria mixta* H. Nordsieck, Arch. Molluskenk. 114: 200, pl. 12 fig. 11.

Type material. — Holotype SMF 256239/1.

Notes. — This species was hitherto only known from the type locality close to Mili south of Argos (Mili 4 km in direction to Tripolis). The nominate subspecies seems to be restricted to the mountain range neighbouring the road from Mili to Tripolis, where it seems to be vicariant with *A. petrosa*.

It should be noted that there are similarities between *A. m. mixta* and *A. (Sericata) lutracana* H. Nordsieck, 1977. In particular, the mode of ribbing, the clausilium plate and the form of the lower lamella are strikingly similar.

Material. — ARGOLIS/ARCADIA: SMF 93747/12, road from Argos to Tripolitza, on the pass over the Parthenion mountains, 1926, coll. K. L. Pfeiffer; Mili, 5 km in direction to Achladokambos (3 km W. of the cross-roads), 28.10.1997, leg. & coll. NORDS.

*Albinaria mixta inflexa* n. ssp. (figs. 33-34, 62)

Locus typicus. — Greece: Peloponnese, Arcadia, Astros, 4 rkm E. Hãradros, 26. 6. 1994, 94/130, leg. E. Neubert.

Type material. — Holotype SMF 311507/1. Paratypes SMF 311508/5, NMNH 59060/5, 5 in NORDS, 50 in NEUB.

Diagnosis. — A subspecies of *A. mixta* with a less densely ribbed shell.

Description. — The protoconch is obtuse and smooth. The first whorls of the teleoconch are coarsely ribbed. On the subsequent whorls, the ribs become faint, the shell seems almost to be smooth. The last whorl and in particular the neck are covered by densely packed and fine ribs. The colour is yellowish to grey with faintly darker axial flames. Sometimes, the shell is elongate cylindrical.

The aperture is rounded and disconnected from the last whorl. The lip is porcellaneous white and somewhat reflected. A small palatal callus situated beneath the principalis can be found in almost all specimens. Corresponding to the principalis there is a swollen area on the surface of the last whorl. The columellaris is very narrow and situated deep in the aperture. The basalis is elongated towards the aperture, but often it is reduced to a small triangle at the basis of the lunella. The plate of the lower lamella is characteristically thickened, its rims are curved upwards. The upper lamella is long and runs parallel to the well-developed spiralis.

Affinities. — This new subspecies differs from the nominate form by its elongated shell and the reduced ribs on most parts of the teleoconch whorls. It shares the typical character of the clausilium plate, which in this form is seldomly found within the genus *Albinaria*.

Measurements (holotype). — D = 17.2; H = 4.2; PH = 4.4; PD = 3.5; W = 10.25.

Material. — ARCADIA: Astros, 4.6 rkm after the cross-roads to Hãradros, 18.7.1996, leg. & coll. NEUB (paratypes); Astros, small canyon opposite to the entrance of Hãradros, 18.7.1996, 96/20, leg. & coll. NEUB.

Etymology. — From lat. *inflectere* = to curve for the characteristic form of the clausilium plate.

Notes. — The specimens of '4.6 rkm after the cross-roads' are considered to be paratypes, because this locality is situated only 300 m away and 50 m below the type locality. Both localities form part of a gentle slope of limestone hills with typical Macchia vegetation dominated by *Quercus coccifera*. The animals live in small crevices in and under the boulders. Opposite, the steep rocky slopes are inhabited by a population of *Isabellaria adriani* Gittenberger, 1987, which may belong to a hitherto undescribed new form of this species. Both taxa occur sympatrically on the slopes of a small canyon opposite to the entrance of Hårados.

*Albinaria argynnis argynnis* Westerlund, 1898 (figs. 35-36, 62)

1898 *Clausilia argynnis* Westerlund, Annuaire Mus. Zool. Acad. Imp. Sci. St. Pétersbourg 3: 168.

Locus typicus. — Peloponnesus, Astros, Hag. Jani. The type locality 'Hagia Jani' is here identified with Ag. Ioannis, a place (monastery, village?) which had been situated in the area of the recent village Stólos (pers. comm. H. Nordsieck).

Type material. — GNM 2958. This lot contains two specimens and a label in Westerlund's handwriting. It reads: '*Cl. argynnis* W., Gr., Pelopones. Astros Hag. Jani. Kr.' and has to be regarded the type lot. One specimen was already separated and is here designated as lectotype as it is close to Westerlund's original description and measurement. As both lectotype and paralectotype are dead collected and eroded specimens, details of sculpture and coloration are taken from recently collected samples. Paralectotypes: SMF 93392/7, Hagias Jani at Astros, coll. O. Krüper; SMF 66323/1, Hagias Jani at Astros, coll. O. Boettger ex Krüper 1900.

Description. — The tall subventricose shell is greyish to light corneous brown. The surface is covered by a white layer. In particular in the upper teleoconch whorls, this layer is interrupted by broad opaque axial streaks. It disappears on the lower whorls. The sculpture of the upper teleoconch consists of sharp ribs with wide interspaces. Often, the subsutural part of the ribs is somewhat thickened forming a very small papilla. The lower part of the ribs usually diminishes. The medium whorls are smooth or display very fine and crowded riblets. On the last whorl, a row of suprasutural ribs can be seen leaving the middle of the whorl (above the aperture) smooth. On the cervix, these ribs are complete, coarse and irregularly spaced. Both keels are very strong with a broad and deep furrow in between, the cervix is somewhat constricted. The dorsal keel is humped apically.

The aperture is subquadrate, the peristomial rim broadly reflected. The lunella has a dorsal position. Next to principalis and lunella, a broad upper palatalis is present which is not connected to the lunella. The basalis is strong, elongated and always runs on the elevation caused by the cervical furrow. The subcolumellaris is S-shaped with a straight exterior part. It never protrudes into the aperture although it is fully visible in a perpendicular view. The lower lamella is broad and formed like a half-moon. It gently enters the interior of the shell. Frontally, it is subtruncate and somewhat thickened.

Measurements (lectotype). — H = 18.95; D = 4.9; PH = 4.9; PD = 4.1; W = 10.5.

Affinities. — *A. argynnis* is close to the herein described *A. solicola*. To improve the view of the complete group, pictures of the two hitherto known subspecies of *A. argynnis*, *A. a. profundella* Gittenberger, 1994 and *A. a. levipalatalis* Gittenberger, 1994, are addi-

tionally supplied (figs. 37-40). Gittenberger (1994: 56) suggests the taxon *I. campylauchen* (O. Boettger, 1883) to be the sister species of *A. argynnis*. Indeed, there are similarities in several characters, but the relationship is still unclear as *I. campylauchen* has a G-type clausiliar. The theories concerning the status of both 'genera' involved (*Albinaria* and *Isabellaria*) still is a matter of scientific dispute and far from being solved. In the north, *A. bigibbosula* should also be considered to have relationships as in this species, an upper palatalis is also present. It has to be stressed, that character states like 'basalis present' or 'upper palatalis present' could be misleading when used in phylogenetic reconstruction. Both characters are widespread in not closely related European clausiliid taxa and thus can be considered to be plesiomorphic. Using them makes the danger of constructing paraphyletic groups evident (Nordsieck, 1997).

Material. — ARCADIA: Leonidion, Dafnon valley 3 km in direction to Kosmas, 30.10.1997, leg. & coll. NORDS; Leonidion, Dafnon valley 11.5 km in direction to Kosmas, 30.10.1997, leg. & coll. NORDS; Dafnon valley, Mon. Elonis at the cross-roads, 30.10.1997, leg. & coll. NORDS; Mon. Elonis 6 km in direction to Kosmas, 30.10.1997, leg. & coll. NORDS; at the cross-roads to Tiros, 1 km in direction to Agios Andreas, 29.10.1997, leg. & coll. NORDS; on the coastal road 2 km N. of Paralia Tirou, 11.7.1987; 5 km E. of Kosmas alongside the road to Leonidion, 11.7.1987, leg. & coll. NEUB; Dafnon valley, 8 km E. of Mon. Elonis, 11.7.1987, leg. & coll. NEUB; do., 26.6.1994, leg. & coll. NEUB; northern Parnon, 5 km W. of Hárados opposite to Platanos, 18.7.1996, leg. & coll. NEUB (= SMF 311257/8); alongside the road from Platanos to Sitena above Platanos, 580 m alt., 18.7.1996; limestone slope 1 km S. of Sitena, 750 m alt., 26.6.1994, leg. & coll. NEUB; do., 18.7.1996, leg. & coll. NEUB; 3 km W. of Kastanitsa, *Abies cephalonica* forest, under limestone rubble, 1200 m alt., 26.6.1994, leg. & coll. NEUB; 3.6 rkm S. of Peletá in direction to Kremasti, 19.7.1996.

***Albinaria argynnis geraniensis* n. ssp. (figs. 41-42, 62)**

Locus typicus. — Greece: Korinthia: Northern Geranion mountains ca. 1.5 km from Paraliá Shinou in direction to Alepochori, 50 m alt., on limestone rocks; leg. P. Subai, 14.5.1991.

Type material. — Holotype SMF 311503/1. Paratypes NMNH 59059/1, 4 in SUB.

Diagnosis. — A subspecies of *A. argynnis* with a medium-sized to big shell. Both moderately strong keels are equal in size. There is a tendency to retain the exterior upper palatalis.

Description. — The shell is medium-sized to large. A white surface layer is present and ornamented by opaque axial zigzag flames. On the subapical teleoconch whorls, ribs are only subsuturally present and fade in their lower parts. The medium teleoconch whorls are almost smooth, the cervical area is covered by moderately dense and coarse ribs. On the cervix, basal and dorsal keel are strong and of almost equal size.

The lunellar is situated dorsally and consists of principalis, lunella (connected to inner part of upper palatalis) and a strong basalis. The exterior part of the upper palatalis is indicated by a shallow callus. In a few specimens, this part is completely present forming a strong fold.

Measurements (holotype). — D = 18.75; H = 4.8; PH = 4.7; PD = 3.75; W = 10.

Affinities. — This subspecies of *A. argynnis* looks very similar to *A. grisea* which lives (as far as known) on the surrounding slopes of the Geranion mountains. Position of the lunellar, the pronounced dorsal keel, presence of a strong basalis and upper palatalis makes it easy to separate both taxa. Size, keels and nearly completely smooth teleo-

conch separates *A. a. geraniensis* from all hitherto known subspecies of *A. bigibbosula*. It differs from *A. a. argynnis* by the reduction of the upper palatalis and from *A. a. levipalatalis* by its smooth medium teleoconch whorls and the stronger dorsal keel.

Material. — KORINTHIA: Northern Geraniou mountains, ca. 8.5 km from Paralía Shinou in direction to Alephori, 10 m alt., SUB [13], SMF 311504/3; do., NORDS 10225.

At the type locality, this subspecies lives together with *A. (Sericata) lutracana* H. Nordsieck, 1977, and *Idyla bicristata* sp.

***Albinaria solicola solicola* n. sp.** (figs. 44-45, 62)

Locus typicus. — GR: Peloponnese: Arcadia: Livadi N. of Leonidion, 2.5 km from the cross-roads in direction to Tiros, 29.10.1997, leg. H. Nordsieck.

Type material. — Holotype SMF 311505/1. Paratypes NMNH 59062/2, NORDS 10400 (57 dry, 10 preserved), 2 in NEUB.

Diagnosis. — A medium-sized *Albinaria* species with a dorsolateral lunellar with basalis and a heavily maculated shell.

Description. — The shell is medium-sized to small, the medium whorls are nearly cylindrical. The white surface layer is very thick and frequently interrupted by broad opaque axial maculations. Subapically, the teleoconch is coarsely ribbed. On the medium whorls, the shell surface is covered by very fine diminishing ribs or is almost smooth. On the cervix, a sculpture of acute and irregularly spaced ribs is present. In contrast to the well developed basal keel, the dorsal keel is shallow. Both keels are separated by a broad furrow. There is a slit-like umbilicus.

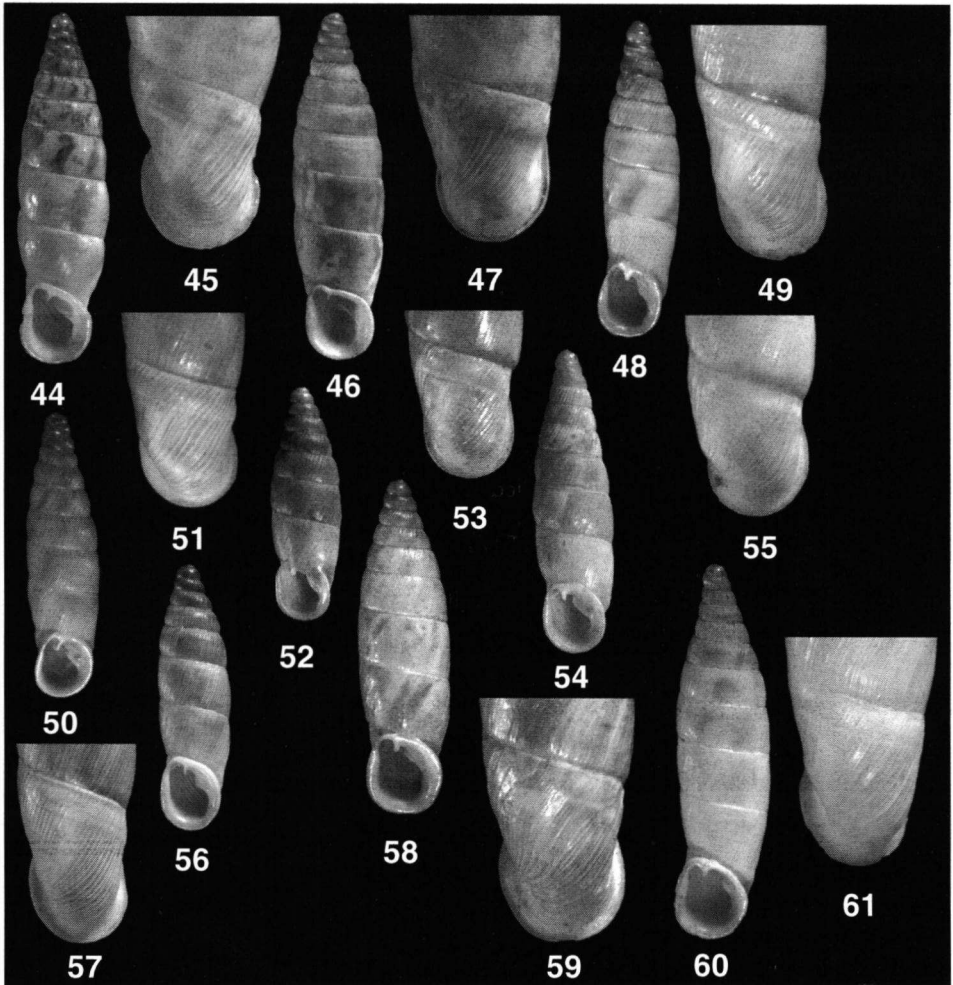
The aperture is oval with a reflected peristomial rim. The lunellar is situated in dorsolateral position. It consists of a principalis and a strong lunella. A basalis is present but may be reduced to a small callus triangle. In some specimens, a thin palatal callus can be found basally to the exterior end of the principalis. The subcolumellaris is S-shaped and somewhat shifted towards the basal canal. The upper lamella is strong and overlaps with the spiralis. The lower lamella is narrow and steep. Its exterior end is subtruncate and always considerably thickened.

Measurements (holotype). — H = 15.6; D = 4.1; PH = 4; PD = 3.25; W = 10.

Etymology. — From lat. *solum* = soil. The subspecific epitheton *solicola* applies to the fact, that this species usually lives close to the bottom in rock crevices or low boulders in contrast to the sympatric *A. discolor moderata* Fauer, 1993, which dwells on steep and open rock faces.

Affinities. — This species differs from all known subspecies of *A. bigibbosula* by its more laterally shifted lunellar. The presence of a basalis is here used as an argument against a confinement with *A. grisea*. To the authors opinion, *A. solicola* is close to *A. argynnis* in several characters. In particular it is similar in the mode of maculation, the presence of two keels, the subsutural bulbous anal canal, form of the lower lamella and a well developed furrow between the keels giving rise to a considerable basal canal. Besides size, it differs from *A. argynnis* by the facts, that in this species the keels are much more pronounced and a strong upper palatalis is always present. The lunellar of *A. a. argynnis* is dorsal and a strong basalis is always found (for *A. a. profundella* refer to the paragraph on *A. argynnis*).

Material. — ARCADIA: at the coastal road, 10 km from the cross-roads to Tiros in direction to Agios Andreas, 29.10.1997, leg. & coll. NORDS; at the coastal road, 3 km from Agios Andreas in direction to Tiros, 29.10.1997, leg. & coll. NORDS; at



Figs. 44-61. Shells of *Albinaria* species; all figures are x 3 (frontal view) and x 5 (dorsal or lateral view). 44-45, *Albinaria solicola solicola* n. sp., holotype (SMF 311505). 46-47, *Albinaria solicola leonidiae* n. ssp., holotype (SMF 311506). 48-51. *Albinaria krueperi krueperi*. 48-49 (SMF 93729: Aegion, coll. Th. Krüper); 50-51, lectotype of *Clausilia furcilla* (GNM 3060). 52-53, *Albinaria krueperi dissipata*, holotype *Clausilia dissipata* (SMF 68908). 54-55: *Albinaria krueperi holostoma*, holotype (SMF 68918). 56-57. Intermediate specimens *A. krueperi* and *A. g. heterochroa*. 56-57 (SMF 93730: Peloponnese, Xylokastron; coll. Th. Krüper); 58-59 (SMF 68880/1: Mega Spilion north of Kalavrita; coll. O. Boettger ex Brenske 1883); 60-61 (SMF 68928/3: Santameri; coll. O. Boettger ex Conéménos 1885).

the coastal road 3 rkm S. of Agios Andreas, in limestone crevices, 19.7.1996, NEUB.

Although not checked personally, the specimens recorded by Fauver (1993: 58) sub *A. grisea* form A from the coast between Agios Andreas and Leonidion are here regarded to represent *A. solicola* as can be seen from his short diagnosis ('geflamantes Gehäuse...deutlicher Basalisporn').

***Albinaria solicola leonidiae* n. ssp.** (figs. 46-47, 62)

Type material. — Holotype SMF 311506/1. Paratypes NMNH 59061/1, 6 in NEUB.

Locus typicus. — Arcadia: Leonidion: 5 rkm W. of Poulithra, at the steep road to Peletá, 460 m alt., 19.7.1996, leg. E. Neubert.

Diagnosis. — A subspecies of *solicola* with a lateral lunellar.

Description. — This subspecies differs from the nominate subspecies in the position of its lunellar, which is shifted laterally. The interior part of the upper palatalis is straight. The lower lamella is more truncate and the subapical ribs are more widely spaced compared to the nominate subspecies.

Measurements (holotype). — H = 15.4; D = 4.1; PH = 3.9; PD = 3.05; W = 10.

Etymology. — This subspecies is called *leonidiae* as it originates from the area around Leonidion.

Material. — ARCADIA: SMF 199251/2, Leonidion, coll. S. H. Jaeckel.

*Albinaria krueperi krueperi* (L. Pfeiffer, 1866) (figs. 48-51, 63)

1866 *Clausilia krueperi* L. Pfeiffer, Malakozool. Bl. 13: 152.

1878 *Clausilia furcilla* Westerlund in Westerlund & Blanc, Aperçu Faune Malac. Grèce: 113 [Morée, environs de Patras à Gerocomio].

Locus typicus. — Ad montem Clissa Graeciae. Unfortunately, the exact position of this mountain is not clear as it could not be found on maps nor in any gazetteers. H. Nordsieck (pers. comm.) proposed to identify the Killini mountains, but although this area is well known, no *A. krueperi* has ever been recorded from there. The few records are concentrated in the north-western region of the Peloponnese, so it seems likely to search for this mountain in this area.

Type material. — *Clausilia krueperi*: The type material was very probably lost with the Pfeiffer collection. Until now, no syntypic material could be traced. *C. furcilla*: GNM 3060. This lot ex coll. Westerlund contained 13 specimens. The label reads: '*C. furcilla* W., Patrasso, Gerocomio'. It is not written by Westerlund himself, but as it is part of his collection, it is supposed to represent the syntypic lot. A lectotype is herewith selected and figured. Obviously, the lot 'SMF 265904/6, Patrasso, Gerocomia, coll. Schlickum ex Brandt ex Blanc' contains paralectotypes of *C. furcilla*.

Description. — The shell is medium-sized and subcylindrical. The white surface layer is weak but present, a maculation is missing. The three to four upper teleoconch whorls are evenly ribbed. On the preceding whorls, the ribs fade, become more irregular and the interspace increases. On the cervix, the ribs are then somewhat more pronounced. The basal keel is flat and inconspicuous, the dorsal keel shallow to more or less lacking.

The aperture is ovate, the interior of the peristome white and somewhat calloused. The rim is reflected. The upper part of the peristome is attached to the preceding whorl. In many specimens, the rims are not connected, but in others a thin callus covers the area between both edges.



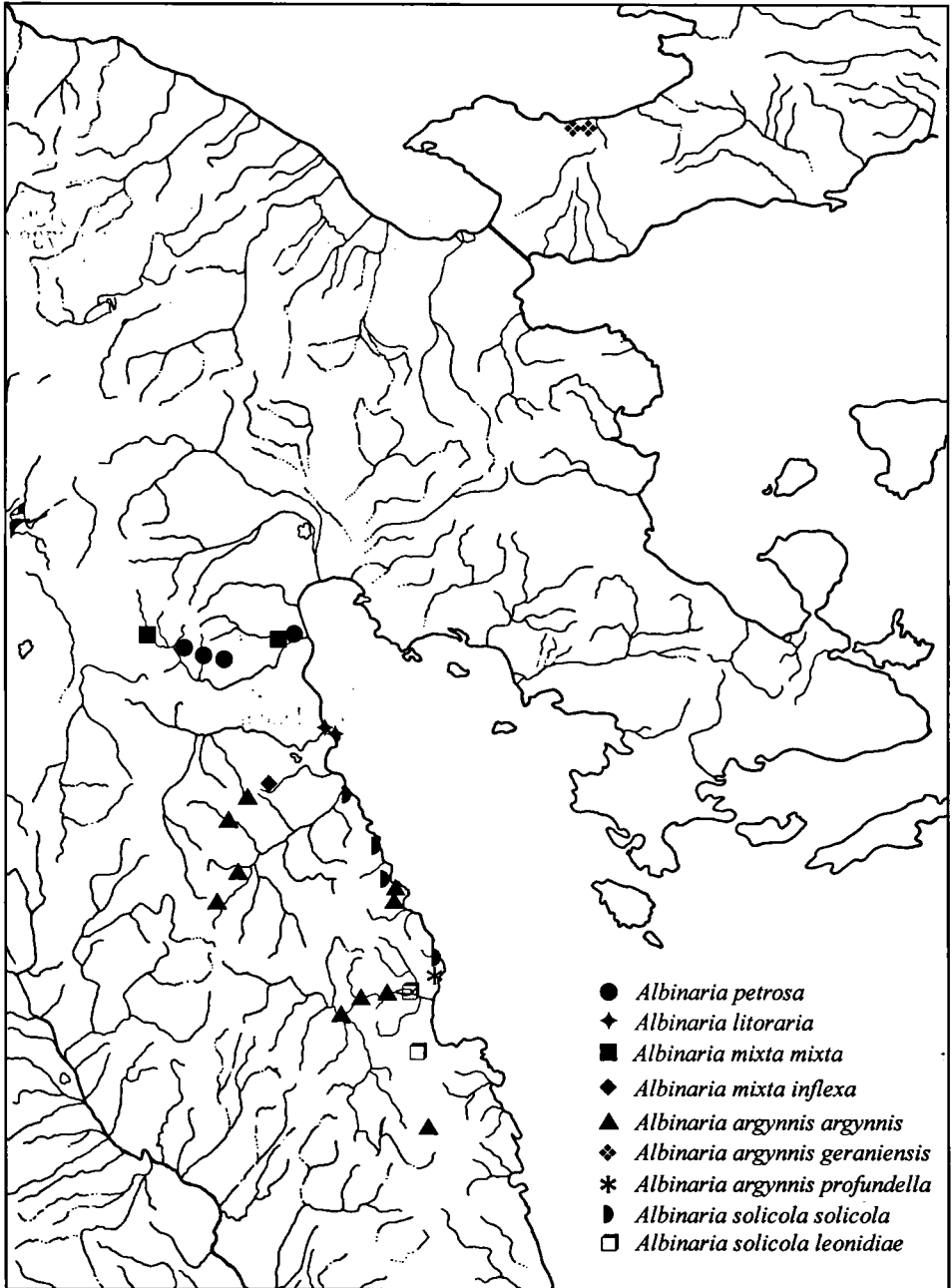


Fig. 62. Distribution of *Albinaria petrosa*, *A. litoraria*, *A. mixta*, *A. argynnis* and *A. solicola*.

The lunellar is dorsolaterally situated. The lunella is always strong and straight. It is connected to a strong to sometimes nearly completely reduced basal. The subcolumnellaris is straight and somewhat elongate touching the peristome. The lower lamella is very narrow, steep with a subtruncate callus frontally.

Material. — SMF 230318/4, Morea, coll. C. Bosch ex Krüper. ACHAIA: SMF 6900/4, N-Morea, Aegion, coll. O. Boettger ex Krüper 1891; SMF 93729/19, Aegion, coll. Krüper; SMF 68917/1, Psathopyrgos, coll. O. Boettger ex Broemme 1892; SMF 230322/4, Psathopyrgos, coll. C: Bosch ex Krüper; SMF 199247/2, Psathopyrgos, coll. S. H. Jaeckel; SMF 69007/3, Patras, coll. O. Boettger ex Thiesse; SMF 93738/8, Patras, coll. Jetschin ex O. Boettger ex Thiesse; SMF 93721/2, Patras, coll. Jetschin ex Schlüter; SMF 230326/1, Patras, coll. O. v. Moellendorff; SMF 265904/6, Patrasso, Gerocomia, coll. Schlickum ex Brandt ex Blanc; SMF 68916/3, St. Elias, Patras, coll. O. Boettger ex Conéménos; SMF 93739/2, Patras, coll. Jetschin ex Conéménos; SMF 32473/2, Patras, coll. Ehrmann ex Preston.

*Albinaria krueperi dissipata* (O. Boettger, 1878) (figs. 52-53, 63)

1878 *Clausilia dissipata* O. Boettger, Nov. Conch. 1. Abt. (5): 137, pl. 3, figs. 6a-e.

1890 *Clausilia aetolica* Westerlund, Fauna Palaearkt. Reg. Binnenconch. I. Supplement: 143 [Goriza in Aetolien].

Locus typicus. — Lepanto in Rumelien (= Nafpaktos).

Type material. — *Clausilia dissipata*: Lectotype SMF 68908/1. Paralectotypes SMF 68909/7, 68909/1, coll. Jetschin ex O. Boettger. *Clausilia aetolica* could not be traced in the GNM (von Proschwitz, pers. comm.).

Diagnosis. — This subspecies differs from the nominate form by smaller shell size, its brownish colour and the somewhat more ventricose teleoconch. Usually, the medium teleoconch whorls are smooth. The basal is short and sometimes almost completely reduced, the subcolumnellaris protrudes on the peristome. The lower lamella is more evenly curved.

It is hard to find real differences between *A. krueperi* and *A. dissipata*. The only character state which supplies some certainty in separating both populations is the general shape of the shell, which is ventricose in *A. dissipata* and slender subcylindrical in *A. krueperi* and the fact, that the apertural rims in *A. krueperi* are more inclined (straight in *A. dissipata*).

Measurements (holotype). — H = 12.7; D = 3.25; PH = 3.2; PD = 2.45; W = 8.

Material. — ETOLIA/ACARNANIA: SMF 199248/5 Naupaktos (Lepanto), coll. S. H. Jaeckel ex Jaeckel & Plate; SMF 93727/19, Epakto, coll. Krüper; SMF 93723/6, Epakto, coll. Jetschin ex Krüper; SMF 230327/4, Epakto, coll. C. Bosch ex Krüper; SMF 69006/1, Epakto, Korinth (sic!), coll. O. v. Moellendorff; SMF 230321/1, Lepanto; SMF 230320/3, Lepanto, coll. O. v. Moellendorff; SMF 68788/7, Lepanto, coll. Kobelt ex Thiesse 1879; SMF 68787/5, Lepanto, coll. Kobelt ex Godet; SMF 93725/11, Aetolico, coll. Krüper; SMF 230324/4, do., coll. Krüper; SMF 68913/3, do., coll. O. Boettger ex Krüper 1891; SMF 93724/9, Missolonghi, coll. Krüper; SMF 230325/11, do., coll. Krüper; SMF 68911/5, do., coll. O. Boettger ex Thiesse; SMF 93726/13, Goritza, coll. Krüper; SMF 93719/39, do., coll. Krüper; SMF 68914/1, do., coll. O. Boettger ex Krüper 1888; SMF 94823/4, do., coll. Jetschin ex Krüper; SMF 230323/9, Kryoneri, coll. Krüper; SMF 68912/1, do., coll. O. Boettger ex Krüper 1900; SMF 93728/4, Klissura, coll. Jetschin; SMF 68915/3, Varassova, coll. O. Boettger ex Conéménos; SMF 93720/2, Etolien, coll. Jetschin ex Conéménos; SMF 93969/1,

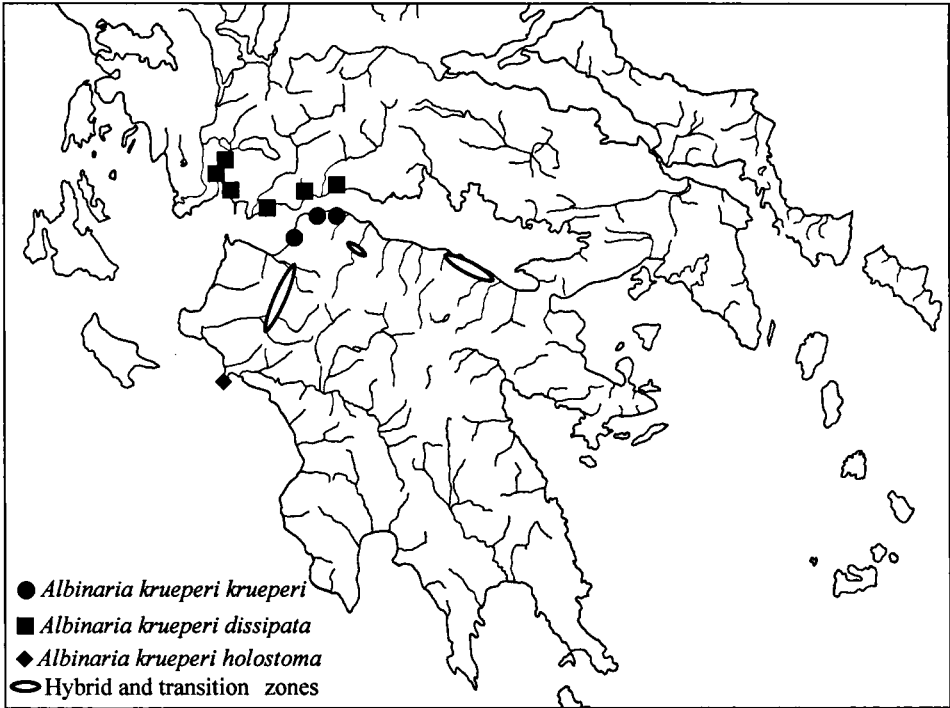


Fig. 63. Distribution of *Albinaria krueperi*. Hybridisation zones with *A. g. heterochroa*.

Akarnanien, coll. Jetschin ex Krüper 1883. FOKIDA: W. of Eratini, under shrubs and rocks in the bay of Ag. Spiridon, 26.6.1987, leg. & coll. NEUB.

*Albinaria krueperi holostoma* (O. Boettger, 1883) (figs. 54-55, 63)

1883 *Clausilia krueperi* var. *holostoma* O. Boettger, Proc. Zool. Soc. London 1883: 338.

Type material. — Lectotype SMF 68918/1. Paralectotypes SMF 68919/16; 68921/4, coll. Kobelt ex Thiesse 1882; SMF 68920/2, coll. Kobelt ex O. Boettger; SMF 93735/4, coll. Jetschin ex O. Boettger 1881.

Locus typicus. — Cape Katakolo, S. of Ilia, Morea.

Diagnosis. — This subspecies differs from *A. krueperi* in the fact, that the peristome almost completely protrudes from the penultimate whorl. Only a very small area is left adhered to the whorl. The aperture is rounded. Moreover, the ribs on the medium teleoconch whorls are somewhat finer and the subcolumellaris is shorter. The suture is somewhat deeper and thus, the medium teleoconch whorls are somewhat more ventricose. In the lunellar, there are all intergrades of 'basalis present' to 'basalis reduced'.

Variation within the material from the type locality concerns the degree of adherence of the peristome to the whorl. All intergrades from 'adhered' to completely protruded can be found. So, this character is somewhat doubtful when used to separate *A. k.*

*holostoma* from *A. k. krueperi* but shape of the shell and the difference in sculpture support a differentiation. Unfortunately, not enough is known about the area between Patras and Cape Katakolon. The habitat at the cape is not that suitable for Clausiliidae as open limestone rock faces seem to be restricted to a small area (which suffers from intensive recent house construction!). Most of the habitat is covered by fine sediments and concreted 'sandstone'. The surrounding is a vast agricultural plain so that it is likely, that the Katakolon population is quite isolated.

Measurements (lectotype). — H = 13.45; D = 3.55; PH = 3.4; PD = 2.8; W = 10.

Material. — ELIS: SMF 32468/2, Katakolon, coast of Elis, coll. Ehrmann ex Schlüter; SMF 93737/5, Katakolo, coll. C. R. Boettger 1904; SMF 68923/3, Katakolo, coll. Reinhardt ex v. Oertzen; SMF 93736/2, Elis Morea, coll. Jetschin ex Conéménos 1897; SMF 230319/4, Katakolo, coll. Bosch ex Krüper; SMF 68924/5, Katakolo, coll. O. v. Moellendorff; SMF 68922/4, Katakolo, coll. Nägele ex Krüper 1890; SMF 93733/59, Katakolo, coll. Krüper; Katakolon, low rocks in a shrub forest at Ag. Ioannis, 24.7.1996, leg. & coll. NEUB.

## DISCUSSION

The ranges of the species of *Albinaria* discussed here in the north-eastern Peloponnese are small compared to those of other molluscs but not exceptional within the framework known from Clausiliidae, in particular in the eastern mediterranean. In the center of these areas, the taxa often represent the only *Albinaria* species. Additionally, some interesting observations should be noted to support a more detailed analysis in the future.

In some species, vicariance within a few kilometres can be found. This is proven for *A. bigibbosula/grisea* whose ranges are known to overlap in a narrow strip of land in the eastern Argolis on the slopes of the Trapezona and Arahneo mountains to the ancient Epidaurus in the south. Sympatric occurrence is reported several times, but in the older collections, localities are not precise enough. They almost always indicate areas but not the actual spots where the specimens had been found. From the recent collections investigated, a mosaic type of distribution seems to be an appropriate description. This is also true for the species pair *A. argynnis/solicola*, which seem to alternate along a narrow coastal strip in Arcadia from Agios Andreas to Leonidion, at least. In addition, both species are sympatric but not syntopic with *A. discolor moderata*. This species dwells on open and steep rock faces exposed to the sea while *A. argynnis* or *A. solicola* are always found in close contact to the bottom. Another example on a larger scale is displayed by *A. argynnis* and *A. grisea*. The eastern slope of the Parnon mountains seem to be inhabited by *A. argynnis* only, while from the western area only *A. g. immensa* and *A. g. micromaculata* are known. Sympatry is only recorded from the elevated plateau south of Peletá. In the area of *A. a. geramiensis*, no *A. grisea* is recorded. At the coast, a small isolated (?) population of *A. argynnis* was described by Gittenberger (*A. a. profundella*), which might even be interpreted as a separate species.

These examples of mosaic distribution patterns may be explained as a separation of closely related species inhabiting similar ecological niches as is very likely for *A. argynnis/solicola*, at least. On a larger scale this may be true for *A. grisea* and *A. bigibbosula* as *A. bigibbosula* inhabits a small area within the large distribution area of *A. grisea* where it was able to withstand the competition situation.

The map supplied in Schilthuizen et al. (1996) shows the distribution of a few

*Albinaria*/*Isabellaria* species in the eastern Peloponnese. According to the locality (1 km east of Kandia) given for no. 1 (*A. hohorsti*), it is clear, that *A. b. sybillae* was investigated here. A small area in the Argolian basin is indicated for *A. bigibbosula* s. lat. which is here supported by the analysis of conchological characters. The same authors propose a close relationship between *I. adriani* and *A. bigibbosula* as evidenced in their fig. 5. To the author's opinion, the description of several new species in close spatial relationship to *I. adriani* shows, that it still might be too early for phylogenetic analysis on a specific level. In agreement with the authors, a sample size of five species is not appropriate for such a complex situation as shown up in the area. For example, *I. adriani* should be compared to *A. litoraria* as both species inhabit the same area and the remarkable upper lamella of *A. litoraria* might indicate a relationship to *Isabellaria*. A clearer view on the relationship *A. grisea*/*bigibbosula* would also be helpful.

Another problem arises when analyzing the relationship of the *A. krueperi*/*g. heterochroa*-group (fig. 63). Sympatry of *A. g. heterochroa* with *A. krueperi* is not recorded yet. Populations of *A. g. heterochroa* as defined in this publication can only be found in the elevated central part of the Peloponnese. It is absent in the three southern peninsulas as well as in the coastal areas. The north-western coast is inhabited by *A. krueperi krueperi*, but towards the eastern area, the characters of the shells begin to change in several details (fig. 56). In the *Albinaria* taxon from Xilokastro, the ribbing of *A. krueperi* is enhanced, but in addition, the lunellar is shifted in dorsolateral direction, the basalis (and often the lower part of the lunella as well) is lacking and the peristome is usually not adhering to the penultimate whorl. The characters of the peristome frequently caused authors to confuse this form with *A. k. holostoma* (as evidenced in the SMF collection) which clearly differs by its finer ribbing and the lunellar.

Material. — KORINTHIA: SMF 93730/33 & SMF 93734/11, Xylokastron, coll. Krüper; SMF 68927/4, do., coll. O. Boettger ex Krüper 1891; Xilokastro, on a high plateau between Pellini and Dendro, 400 m alt, 11.7.1996, leg. & coll. NEUB.

Another example for such an influence can be seen in a specimen from Mega Spileon north of Kalavrita (fig. 57). Here, shape, size, sculpture and lunellar is typical for *A. g. heterochroa*, while the broadly adhered peristome is nearly identical with *A. k. krueperi*.

Material. — ACHAIA: SMF 68880/1, Mega Spilion N. of Kalavrita, coll. O. Boettger ex Brenske 1883.

South of Patras, a few specimens are known from the lower hills around Halandritsa and Santomeri (= Santameri) (fig. 58). These are here interpreted to represent transitional forms between *A. k. krueperi* and *A. k. holostoma*. This can be seen by the sculpture of the medium teleoconch whorls and the fact, that adhering and non-adhering peristomes can be found in the same population. In a few specimens, the lower lamella resembles that of *A. contaminata* Rossmässler, 1835 (in particular *A. muraria* A. Schmidt, 1868 from Zakynthos).

Material. — ACHAIA: SMF 68928/3 Santameri, coll. O. Boettger ex Conéménos 1885; SMF 68929/2, do., coll. O. v. Moellendorff; SMF 68925/2, Akayà, coll. O. Boettger ex Conéménos 1885; SMF 68926/1, Kalandritsa, Conéménos 1885; SMF 93731/1, do., Conéménos 1899.

The examples show, that *A. grisea* taxa display two basic distribution patterns when overlapping with other taxa. One is the mosaic pattern of vicariant species, the other is a broad spatial zone where characters of both species involved begin to mix. As a hypotheses it is proposed, that *A. k. krueperi* and *A. g. heterochroa* are genetically not completely separated and thus are able to interbreed. More precise collection in the transitional zone between *A. g. grisea* and *A. g. heterochroa* should be done to prove, that

there are no sympatric localities and both taxa can be treated on a subspecific level as hitherto practised. Although living in the same area in the mountainous northern Peloponnese, no examples for similar hybridisation effects could be found between *A. arcadica* (O. Boettger, 1878) and *A. g. heterochroa* or *A. krueperi*.

Attention should be paid to the fact, that in a restricted area in south-western Argolis and the neighbouring area of Arcadia, only evenly ribbed species occur while all other species in the surrounding area, the medium teleoconch whorls are smoother. In particular, this is found in the *A. bigibbosula* populations known from the Argolian basin (Kariá, Mykene, Nemea, Argos, Kiverion). The southern boundary of this population is unknown but very likely it overlaps with *A. profuga* (and its related forms) and *A. petrosa*, at least.

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