

Revision of the genus *Lindholmiola* Hesse, 1931 (Gastropoda: Pulmonata: Helicodontidae)

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Revision of the genus *Lindholmiola* HESSE, 1931 (Gastropoda: Pulmonata: Helicodontidae)

Peter Subai & Eike Neubert

ABSTRACT

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A revision of the land snail genus *Lindholmiola* that is mainly found on the Balkan Peninsula is presented. Until now, 9 valid species are considered to form the genus: *Lindholmiola lens* (A. FÉRUSSAC, 1832), *L. barbata* (A. FÉRUSSAC, 1821), *L. corcyrensis* (ROSSMÄSSLER, 1838), *L. girva* (FRIVALDSZKY, 1835), *L. gyria* (ROTH, 1839), *L. pirinensis* JAECKEL, 1954, *L. regisborisi* (A. J. WAGNER, 1927), *L. reischuetzi* FALKNER, 1995 and *L. spectabilis* URBANSKI, 1960. All species are characterized by their shells and the anatomy of their genital organs; their distribution patterns are shown in maps. All available type specimens and characteristic shell-forms are illustrated.

Key words: Taxonomy, *Lindholmiola*, anatomy, distribution.

Kurzfassung: Eine Revision der hauptsächlich auf der Balkan Halbinsel beheimateten Landschneckengattung *Lindholmiola* wird präsentiert. Hierbei werden folgende 9 Arten als valide anerkannt: *Lindholmiola lens* (A. FÉRUSSAC, 1832), *L. barbata* (A. FÉRUSSAC, 1821), *L. corcyrensis* (ROSSMÄSSLER, 1838), *L. girva* (FRIVALDSZKY, 1835), *L. gyria* (ROTH, 1839), *L. pirinensis* JAECKEL, 1954, *L. regisborisi* (A. J. WAGNER, 1927), *L. reischuetzi* FALKNER, 1995 sowie *L. spectabilis* URBANSKI, 1960. Die Gehäusemerkmale sowie die Merkmale der Genitalorgane aller Arten werden dargestellt, ihre Verbreitung wird anhand von Karten illustriert. Alle verfügbaren Typusexemplare sowie charakteristische Formen werden abgebildet.

Schlüsselwörter: Taxonomie, *Lindholmiola*, Anatomie, Verbreitung.

Introduction

The revision of the genus *Lindholmiola* was initiated by several Dutch colleagues, who contributed by basic bibliographic work (L. J. M. Butot and E. Gittenberger), and the extensive collection of both, shells and preserved specimens by W. Neuteboom and W. J. M. Maassen. A preliminary step was made by Gittenberger & Groh (1986), who clarified the status of the two oldest available names in the genus by designating lectotypes for *Helix barbata* A. FÉRUSAC, 1821 and *Helix lens* A. FÉRUSAC, 1832. The unfinished version of this manuscript was then handed on by Gittenberger to the present authors including his photographic documentation of specimens.

The list of synonyms contains only those references where the recorded species can be identified. For all other records, the specimens have been checked by the authors personally. The localities follow an order from North to South, and from West to East; if possible, all localities are written using their respective national notation. A few localities could not be traced; their spelling is copied from the original labels or reference.

In some species of *Lindholmiola*, the aperture is bent downwards, which makes it difficult to measure its absolute height. For this reason, all measurements of the apertural height presented here use the following method: The shell is fixed to the ground exposing the ventral side to enable the exact measurement of the shell height; the value of the apertural height in frontal view is added in parentheses. The number of whorls is counted following the method of Ehrmann (1933: 21). Genital organs are described using the gonads as proximal and the atrium as distal end. All drawings are to the same scale, all measurements in mm.

Material

Collections used:

E&F	Private collection Z. Erőss and Z. Fehér, Budapest
HNHM	Hungarian Natural History Museum, Budapest
Maa	Private collection J. M. W. Maassen, Duivendrecht
NHMG	Naturhistoriska Museet, Göteborg
NMNH	National Museum of Natural History, Sofia
NNM	Nationaal Natuurhistorisch Museum, Leiden
S	Private collection P. Subai, Aachen (now at the NMBE)
SMF	Senckenberg Museum, Frankfurt a. M.
ZMB	Zoologisches Museum, Berlin

ZMZ Zoologisches Museum the Universität Zürich-Irchel
ZSM Zoologische Staatssammlung, München

Other abbreviations:

aH apertural height
aW apertural width
D shell diameter
H shell height
n. id. UTM-Code not identified
UTM UTM-Code for registration of the European invertebrates

Systematic account

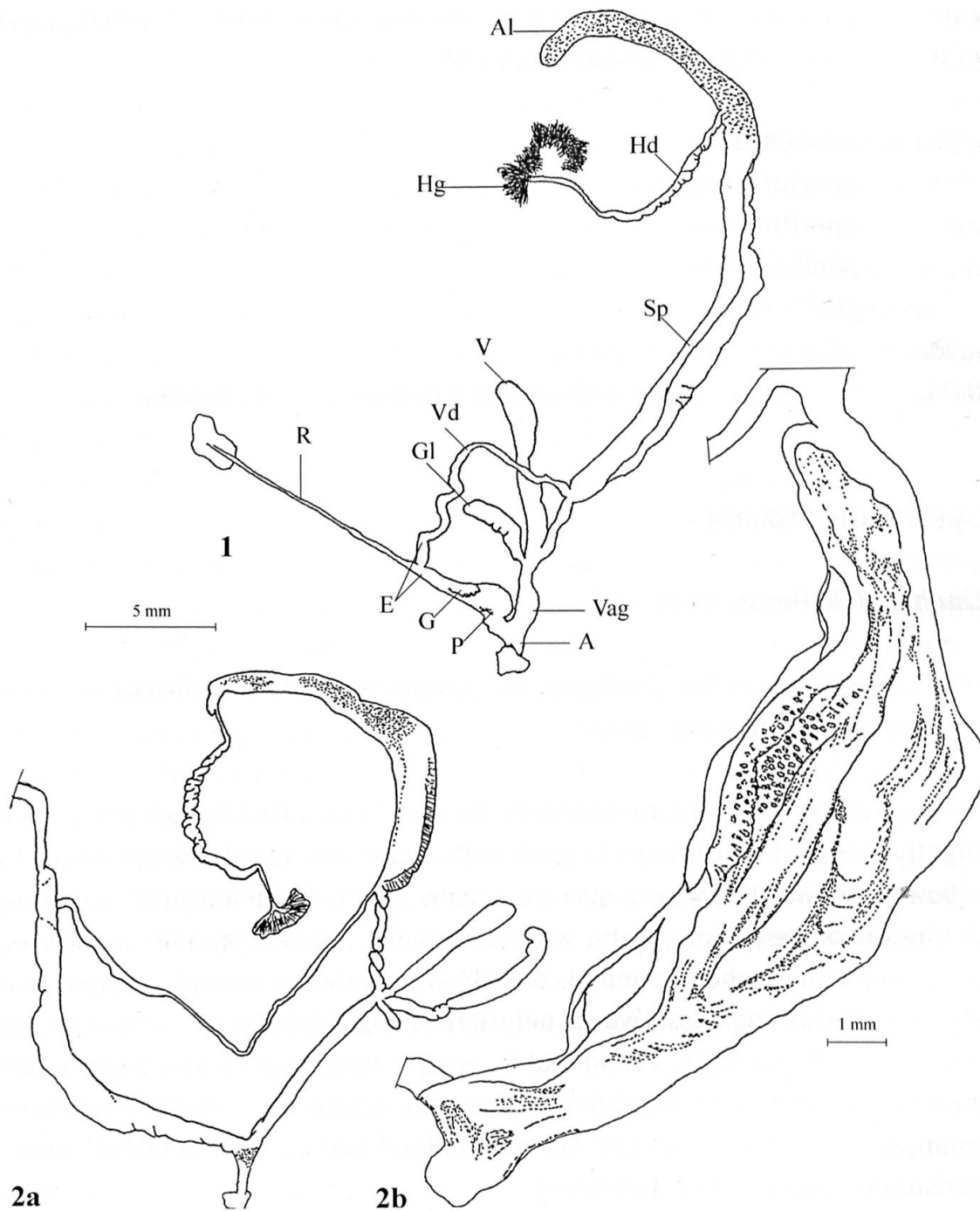
Lindholmiola Hesse, 1931

1931 *Lindholmiola* HESSE, Zoologica, 18: 50 [type species by original designation *Helix lens* A. FÉRUSSAC, 1832].

Description: shell flat to lentiform (H: 3.1–7.5 mm, D: 7.2–16.5 mm); spire slightly elevated (exception: *L. gyria* with a concave spire); colour brown to yellowish-brown; teleoconch surface usually with hairs; teleoconch sculpture of fine to coarse radial riblets; whorls regularly increasing, $5\frac{1}{4}$ – $7\frac{3}{4}$ whorls; periphery of last whorl rounded, bluntly shouldered or sharply keeled; last whorl strongly bends downwards before reaching the aperture; umbilicus narrow to moderately wide, cylindrical to perspective, usually only slightly covered by the peristome (exception: *L. barbata*, where the umbilicus is almost completely covered); aperture narrow, oblique and curved (in lateral view); peristome narrow to broad, reflexed.

Genital organs (Fig. 1) simple; atrium short; penis a club-shaped tube, epiphallus distally strongly contracted (often, this area is covered by a glandular tissue); penial retractor muscle attaching at the central part of epiphallus, which connects to vas deferens without any visible distinction; vagina short (completely reduced in *L. reischuetzi*); glandula a single tube with a narrow stem and a broader hose often sculptured by crossing furrows; bursa copulatrix with a narrow pedunculus and a more broadened vesicle (often not clearly visible) (Schileyko 2006: 1919, Fig. 2439).

Interior of the terminal genital organs with a long fold starting at the genital pore and ending at the distal vagina; atrial part of the fold often subdivided by small crossing furrows (an additional semicircular crested fold in the atrium



Figs. 1–2. Genital organs of Helicodontidae. Fig. 1: *Lindholmiola barbata*; Greece, Kríti, Nomos Haniá, Bay of Souða, 100–150 m from the mouth of the river S of the English cemetery. Fig. 2: *Helicodonta obvoluta* (O. F. MÜLLER, 1774); Belgium, valley of the Meuse, 500 m from Annevoie in direction to Dinant, 2a) situs of genital organs, 2b) interior structure of penis. — Abbreviations used for the description of the genital organs: A = atrium, Al = albumen gland, E = Epiphallus, G = distal glandular part of epiphallus, Gl = Glandula, Hd = hermaphroditic duct, Hg = hermaphroditic gland, P = Penis, R = retractor muscle, Sp = Spermoviduct, V = vesicle, Vag = Vagina, Vd = Vas deferens.

can be found in *L. regisborisi*); characters of the penial lumen differ according to the species, usually with 2–3 raised longitudinal pilasters filling at least the distal half of the penial lumen (exception: In *L. corcyrensis*, the longitudinal pilasters are replaced by v-shaped, obliquely arranged, short folds).

It has to be stressed that the characters of the terminal genital organs as described above can only be seen in sexually mature specimens. In juveniles, the folds are missing or very weak.

Differentiating remarks: The shells of *Helicodonta* are also depressed but never lentiform and usually concave. In species of this genus, the whorls increase faster in width, particularly the ultimate and the penultimate whorl, which are always broader than those in *Lindholmiola*. Additionally, they are laterally rounded and only slightly shouldered. The umbilicus of *Helicodonta* spp. is broader and more perspective if compared to *Lindholmiola*, and their apertures have often three indentations which are even thickened to form teeth. The peristome is usually broadened to form a lip.

Both genera differ in the morphology of their genital organs: *Helicodonta* species have a considerably longer penis and vagina and a short tubular organ of unknown function that branches off distally to glandua and bursa copulatrix (Fig. 2) (not present in *Lindholmiola*). In the interior of the terminal genital organs, there are elongated narrow pilasters in the vagina (different in *Lindholmiola*), and in the middle of the penis, the penial lumen is filled by two thickened pilasters (different in *Lindholmiola*). In the distal part of the penis, an additional pilaster covered by small punctiform granules is found (not present in *Lindholmiola*). The glandular tissue at the distal end of the epiphallus of *Lindholmiola* spp. is missing in *Helicodonta* species.

***Lindholmiola lens* (A. FÉRUSSAC, 1832)** Figs 3–6, 7–11, 12, 15

1821 *Helix barbata* A. FÉRUSSAC, Tableaux systématiques des animaux mollusques classés en familles naturelles: 41 (Folio edition) or 37 (Quarto edition), Nr. 152 [partim].

1832 *Helix lens* A. FÉRUSSAC (in A. Férussac & Deshayes), Histoire naturelle générale et particulière des mollusques terrestres et fluviatiles, (Atlas), 22–27: Taf. 66, F. 2 [Lectotype, design. Gittenberger & Groh 1986].

1832 *Helix barbata*, – Deshayes, Exped. Moree Moll., p. 162 (non *barbata* FÉRUSSAC).

1838 *Helix lens*, – Rossmässler, Iconographie der Land- & Süßwasser-Mollusken mit vorzüglicher Berücksichtigung der europäischen noch nicht abgebildeten Arten, (1) 2 (1/2): 10, Taf. 32, Fig. 450.

- 1846 *Helix lens*, – L. Pfeiffer, In: Martini & Chemnitz: Systematisches Conchylien-Cabinet, (1) 12 (II): 101, Taf. 13, Fig. 16–17.
- 1848 *Helix lens*, – L. Pfeiffer, Monographia heliceorum viventium, 1: 209.
- 1850 *Helix lens*, – Deshayes (in Férussac & Deshayes), Histoire naturelle générale et particulière des mollusques terrestres et fluviatiles, (Text), 1: 110 [partim, nec descr. et terr. typ.].
- 1853 *Helix lens*, – L. Pfeiffer, Monographia heliceorum viventium, 3: 162.
- 1854 *Helix lens*, – Reeve, Conchiologica Iconica, 7: species 1221.
- 1855 *Helix lens*, – Roth, Malakozoologische Blätter, 2: 30.
- 1859 *Helix lens*, – Mousson, Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich, 4: 258.
- 1859 *Helix lentiformis* Mousson, Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich, 4: 258. Locus typicus: "Thessalie et Attique".
- 1859 *Helix lens*, – L. Pfeiffer, Monographia heliceorum viventium, 4: 187.
- 1868 *Helix lens*, – L. Pfeiffer, Monographia heliceorum viventium, 5: 260.
- 1868 *Helix lentiformis*, – L. Pfeiffer, Monographia heliceorum viventium, 5: 260.
- 1873 *Helix barbata*, – Martens, Malakozoologische Blätter, 20: 32.
- 1873 *Helix lens*, – Martens, Malakozoologische Blätter, 20: 32.
- 1874 *Helix lens*, – Martens, Malakozoologische Blätter, 21: 122.
- 1876 *Helix lens*, – L. Pfeiffer, Monographia heliceorum viventium, 7: 295.
- 1876 *Helix lens*, – Westerlund, Fauna der in der paläarktischen Region lebenden Binnenconchylien, Prodrömus, I: 40.
- 1876 *Helix lens* var. *aliostoma* WESTERLUND, Fauna der in der paläarktischen Region lebenden Binnenconchylien, Prodrömus, I: 41.
- 1876 *Helix lens* var. *lentiformis*, – Westerlund, Fauna der in der paläarktischen Region lebenden Binnenconchylien, Prodrömus, I: 41.
- 1877 *Helix lens*, – L. Pfeiffer, Monographia heliceorum viventium, 8: 576.
- 1879 *Helix (Trigonostoma) lens*, – Westerlund & Blanc, Aperçu sur la faune malacologique de la Grèce inclus l'Epire et la Thessalie: 34.
- 1879 *Helix (Trigonostoma) lens* var. *lentiformis*, – Westerlund & Blanc, Aperçu sur la faune malacologique de la Grèce inclus l'Epire et la Thessalie: 35.
- 1879 *Helix (Trigonostoma) lens* var. *piligera* WESTERLUND & BLANC, Aperçu sur la faune malacologique de la Grèce inclus l'Epire et la Thessalie: 36. Taf. 1, Fig. 10.
- 1879 *Helix (Trigonostoma) lens* var. *callojuncta* WESTERLUND & BLANC, Aperçu sur la faune malacologique de la Grèce inclus l'Epire et la Thessalie: 36. Taf. 2, Fig. 11.
- 1882 *Helix lens*, – Hesse, Jahrbücher der Deutschen Malakozoologischen Gesellschaft, 9: 320.

- 1882 *Helix lens* var. *lentiformis*, – Hesse, Jahrbücher der Deutschen Malakozologischen Gesellschaft, 9: 320.
- 1883 *Helix (Anchistoma) lens*, – O. Boettger, Jahrbücher der Deutschen Malakozologischen Gesellschaft, 10: 323.
- 1883 *Helix (Anchistoma) lens* var. *elia* O. BOETTGER, Jahrbücher der Deutschen Malakozologischen Gesellschaft, 10: 330.
- 1884 *Helix lens*, – Hesse, Jahrbücher der Deutschen Malakozologischen Gesellschaft, 11: 233, Taf. 4, Fig. 5, Fig. 5 a.
- 1885 *Helix (Gonostoma) lens* var. *piligera*, – O. Boettger, in Stussiner & O. Boettger, Jahrbücher der Deutschen Malakozologischen Gesellschaft, 12: 165.
- 1885 *Helix (Gonostoma) lens* var. *lentiformis*, – O. Boettger, in Stussiner & O. Boettger, Jahrbücher der Deutschen Malakozologischen Gesellschaft, 12: 165.
- 1887 *Helix (Caracolina) lens*, – Tryon, Manual of Conchology, 3: 119.
- 1887 *Helix (Caracolina) lens* var. *lentiformis*, – Tryon, Manual of Conchology, 3: 119.
- 1887 *Helix (Caracolina) lens* var. *piligera*, – Tryon, Manual of Conchology, 3: 119.
- 1887 *Helix (Caracolina) lens* var. *callojuncta*, – Tryon, Manual of Conchology, 3: 119.
- 1887 *Helix (Caracolina) lens* var. *aliostoma*, – Tryon, Manual of Conchology, 3: 119.
- 1889 *Helix (Caracollina) lens*, – Martens, Archiv für Naturgeschichte, 55 (1): 172.
- 1889 *Helix (Gonostoma) lens* var. *lentiformis*, – Martens, Archiv für Naturgeschichte, 55 (1): 173.
- 1889 *Helix (Caracolina) lens*, – Westerlund, Fauna der in der paläarktischen Region lebenden Binnenconchylien, 2: 22.
- 1889 *Helix (Caracolina) lens* var. *lentiformis*, – Westerlund, Fauna der in der paläarktischen Region lebenden Binnenconchylien, 2: 22.
- 1889 *Helix (Caracolina) lens* var. *piligera*, – Westerlund, Fauna der in der paläarktischen Region lebenden Binnenconchylien, 2: 23.
- 1889 *Helix (Caracolina) lens* var. *callojuncta*, – Westerlund, Fauna der in der paläarktischen Region lebenden Binnenconchylien, 2: 23.
- 1889 *Helix (Caracolina) lens* var. *elia*, – Westerlund, Fauna der in der paläarktischen Region lebenden Binnenconchylien, 2: 23.
- 1891 *Helix (Gonostoma) lens* var. *callojuncta*, – O. Boettger, Nachrichtenblatt der Deutschen Malakozologischen Gesellschaft, 23 (5/6): 83.
- 1892 *Helix lens*, – Schuberth, Archiv für Naturgeschichte, 58 (1): 8, Taf. 1 Fig. 6.
- 1892 *Helix lens* var. *lentiformis*, – Schuberth, Archiv für Naturgeschichte, 58 (1): 8, Taf. 1, Fig. 7–8.
- 1894 *Helix (Caracollina) lens*, – Pilsbry, Manual of Conchology, 9: 288.
- 1894 *Helix (Caracollina) lens* var. *lentiformis*, – Pilsbry, Manual of Conchology, 9: 288.
- 1894 *Helix (Caracollina) lens* var. *piligera*, – Pilsbry, Manual of Conchology, 9: 288.

- 1894 *Helix (Caracollina) lens* var. *callojuncta*, – Pilsbry, Manual of Conchology, 9: 288.
- 1894 *Helix (Caracollina) lens* var. *aliostoma*, – Pilsbry, Manual of Conchology, 9: 288.
- 1894 *Helix (Caracollina) lens* var. *elia*, – Pilsbry, Manual of Conchology, 9: 288.
- 1894 *Helix (Anchistoma) lens*, – O. Boettger, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 26 (1–2): 2.
- 1902 *Helix (Gonostoma) lens*, – Sturany, Denkschriften der Kaiserlichen Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Klasse Wien, 52: 403.
- 1902 *Helix (Gonostoma) barbata*, – Sturany, Denkschriften der Kaiserlichen Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Klasse Wien, 52: 403 (non *barbata* FÉRUSAC).
- 1918 *Caracollina lens*, – Hesse, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 50: 109.
- 1918 *Caracollina lens lentiformis*, – Hesse, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 50: 109.
- 1918 *Caracollina lens aliostoma*, – Hesse, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 50: 109.
- 1918 *Caracollina lens piligera*, – Hesse, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 50: 109.
- 1918 *Caracollina lens callojuncta*, – Hesse, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 50: 109.
- 1918 *Caracollina lens elia*, – Hesse, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 50: 109.
- 1928 *Helicodonta lens*, – Adensamer & Käufel, Sitzungsberichte der Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Klasse, 137 (10): 793.
- 1928 *Helicodonta lens piligera*, – Adensamer & Käufel, Sitzungsberichte der Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Klasse, 137 (10): 793.
- 1928 *Helicodonta lens lentiformis*, – Adensamer & Käufel, Sitzungsberichte der Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Klasse, 137 (10): 793.
- 1929 *Helicodonta (Caracollina) lens*, – Gambetta, Archivio Zoologico Italiano, 13 (1/2): 51.
- 1930 *Caracollina lens*, – Käufel, Sitzungsberichte der Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Klasse, 139: 184.
- 1931 *Lindholmiola lens*, – Hesse, Zoologica, 31 (81) 1/2: 50.

- 1936 *Lindholmiola lens*, – Fuchs & Käufel, Archiv für Naturgeschichte, N.F. 5 (4): 651. Fig. 77 [partim, not in the Angista canyon close to Drama]
- 1941 *Lindholmiola (Helicodonta) lens lens*, – Käufel & Fuchs, Verhandlungen der Zoologisch-Botanischen Gesellschaft in Wien, 88/89: 201.
- 1960 *Lindholmiola lens*, – Zilch, Euthyneura, p. 693, Abb. 2419.
- 1961 *Lindholmiola lens*, – Jaeckel & Plate, Zoologische Abhandlungen, Abhandlungen and Berichte aus dem Staatlichen Museum für Tierkunde in Dresden, 26 (1): 3.
- 1962 *Lindholmiola lens*, – Klemm, Sitzungsberichte der Österreichischen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse, Abt. I, 171 (6/7): 252.
- 1976 *Lindholmiola lens*, – Frank, Mitteilungen der Zoologischen Gesellschaft Braunau, 2 (9/11): 261.
- 1986 *Lindholmiola lens*, – Gittenberger & Groh, Archiv für Molluskenkunde, 116 (4/6): 220. Abb. 1, a (= 2).
- 1986 *Lindholmiola lens*, – Reischütz, Malakologische Abhandlungen aus dem Staatlichen Museum für Tierkunde Dresden, 11 (9): 94.
- 1990 *Lindholmiola lens*, – Fechter & Falkner, Steinbachs Naturführer, p. 222 Abb. 1–3, 5.
- 1996 *Lindholmiola lens*, – Welter-Schultes, Schriften zur Malakozologie, 9: 22, 31.
- 1996 *Lindholmiola lens*, – Dhora & Welter-Schultes, Schriften zur Malakozologie, 9: 156, 190, Taf. 13, Fig. 167.
- 2002 *Lindholmiola lens*, – Dhora, Studime mbi molusqet e Shqipërisë: 99: 193.

Diagnosis: shell flat, lower whorls with a blunt to sharp keel, umbilicus cylindrical to broadly perspective, penial lumen with two longitudinal pilasters.

Description of shell: shell almost flat, shell colour light brown to yellowish brown; protoconch whorls smooth; initial whorls of the teleoconch with fine radial stripes, developing to small riblets on the subsequent whorls, but decreasing in height on the last teleoconch whorls; on the subsurface, radial riblets weak to almost missing; sculpture of teleoconch of fine granules; below the suture a small stripe devoid of hairs, the remaining shell including the umbilicus covered by usually impermanent hairs (often only the periphery of the shell with hairs); hairs yellowish-brown, 0.56–0.75 mm long; $5\frac{1}{2}$ – $7\frac{3}{4}$ regularly increasing whorls; lower whorls usually flattened with a blunt to sharp keel (sometimes the whorls are more rounded forming an inconspicuous keel); last whorl only slightly descending, then shortly bent towards the aperture; suture moderately deep; umbilicus shape variable, either initially cylindrical and rapidly increasing with the last whorl, or initially broadly per-

spective and regularly increasing, reaching a diameter of 1.6–3.9 mm; aperture oblique, in lateral view slightly to strongly bent; peristomial insertions 2.2–5.9 mm apart, connected by an inconspicuous callus (except in *callojuncta*); peristome sharp to blunt, sometimes slightly reflected; columellar peristomial callus weak, covering the umbilicus ca 10%.

Measurements: H: 3.6–7; D: 7.2–15.6; aH: 2–3.9 (3–6.1); aW: 3.4–7.8.

Details of body (n = 12 from 5 populations: 1 specimen from 2 km N of Neohóri/1; 4 specimens from the pass at Haniá; 1 specimen from E of Glifáda; 2 specimens from 3 km S of Ptéri; and 4 specimens between Olymbía and Kréstena): head and dorsum grey to brown, more bright at the flanks and the posterior body; foot sole cream, sometimes darker at the fringes; mantle on the last 1½ whorls with small irregular dots; dots are more elongate between lung vein and suture and larger than those on the lower side of the mantle; intensity of pigmentation increasing towards the mantle collar, pigments often fuse to a large brown spot on the last whorl; ureter opens 1.5–1 mm before the respiratory pore.

Morphology of the genital organs: penis relatively short, moderately thickened, glandular tissue covering one third to half of the total of the penial tube; penial lumen filled by two longitudinal pilasters of equal length starting as thin threads on the distal end of the penis and ending in the proximal third of the penis with thickened tissue; sometimes a few small folds at the distal end of the penis parallel to the major pilasters; vagina moderately long, usually thickened; glandula with a short stem and a long distal part with deep crossing furrows; bursa copulatrix as long as or somewhat longer than the glandula, the pedunculus reaches ca 60% of the total length of the organ, usually well separated from the vesicle; atrium with a broad and flat pilaster starting at the genital pore, often subdivided by deep longitudinal furrows; vagina filled by a single sometimes broadened pilaster.

Differential diagnosis: Its sisterspecies seems to be *L. spectabilis*, which has a shell that is similar to the form *callojuncta* of *L. lens*. It differs from this form by its more slowly increasing and less perspective umbilicus. Generally, the shell surface in *L. spectabilis* is more coarsely granulated, hairs are almost missing (if present, then below the shell's periphery), its aperture is narrower but higher, its lower rim is more wavy and larger, and its peristomial insertions are closer. In the penial lumen, *L. spectabilis* shows three longitudinal pilasters (instead of two in *L. lens*); according to Fechter & Falkner (1990: 222), its pre-mating behaviour is shorter, and the lack of several behavioural elements proved to establish a mating barrier.

Broader specimens of *L. girva* are similar to that form of *L. lens*, which inhabits the Island Évvia and the easternmost parts of continental Greece



Figs 3–6. *Lindholmiola lens*. Fig. 3: syntype *Helix lentiformis*, ZMZ 508656, "Thessalie et Attique", D = 11.2 mm; Fig. 4: NMBE 515542, Attika, Methana, 500 m before village, 12.07.1996, leg. E. Neubert, D = 12.77 mm; Fig. 5: syntype *Helix lens* var. *callojuncta*, NHMG 372, D = 12.0 mm; Fig. 6: syntype *Helix lens* var. *elia*, SMF 101961, Kumani, Elis, coll. Jetschin ex Boettger, 1883, D = 11.94 mm. — All photos Neubert/Bochud, × 3.

(= *lentiformis*). However, the shell of *L. girva* is less flattened, it has more rounded and less shouldered whorls; its radial riblets are less regular, and its aperture is more strongly bent in lateral view; its penis is longer, but the glandular tissue is less developed; the penial lumen is filled with 2–3 pilasters which are not broadened at their proximal end.

Shells of *L. barbata* are usually more rounded with a blunt keel. Shells of the same size differ by having an additional whorl, and the umbilicus is almost completely covered by the peristomial columellar reflection (for more details refer to *L. barbata*).

Type specimens: Greece, Ilía (= Elis), Koumanis (= Kumani), UTM EG 68, 37.78°N 21.74°E, leg. Brenske, 1883, syntypes *lens* var. *elia*: SMF 101961/6, 225646/1, 225647/2. — Etoloakarnanía, Náfpaktos (= Lèpante, Lepanto), UTM EH 74, 38.39°N 21.82°E, syntype *lens* var. *callojuncta*: NHMG 372.

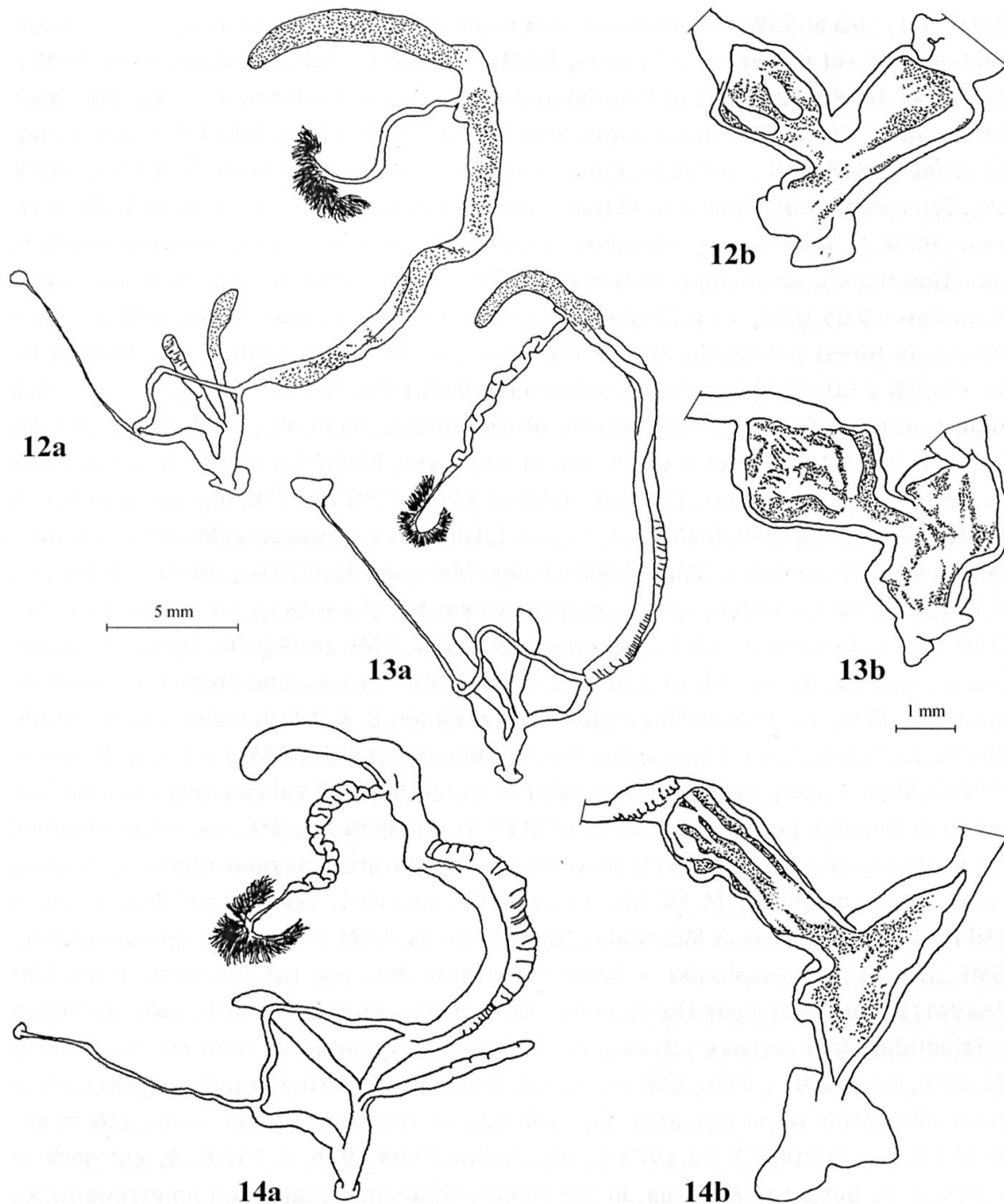
Additional specimens examined:

Greece, Makedonía, Vèrmio Mountains, about 6 km from the highway Vèria–Kozáni direction Séli (= Áno Vèrmio), conglomerate rocks at river bed, 530 m alt., UTM EK 98, 40.4971°N 22.1253°E, leg. Fauer & Subai 24.09.1989, S 15686/1; gorge 2 km N of Neohóri (= NE of Aridéa), on limestone rocks, 250 m alt., UTM EL 94, 41.0475°N 22.0916°E, leg. Subai 09.05.1995, S 15922/13 + 1 (alk.); leg. Subai & Szekeres, 19.5.1997, S 15923/5; 8.5 km NNE of Aridéa, on limestone rocks 3 roadkm. N of Vorinó, 250 m alt., UTM EL 94, 41.06°N 22.09°E, leg. Gittenberger & Uit de Weerd 9.5.2000, NNM/6; 9 km NNE of Aridéa, isolated rocks 6.3 roadkm. N of Vorinó, 440 m alt., UTM EL 94, 41.08°N 22.06°E, leg. Gittenberger & Uit de Weerd 9.5.2000, NNM/2 + 1 (juv.); in Vèria, on loess wall beside the rivulet, 135 m alt., UTM FK 08, 40.5260°N 22.1997°E, leg. Fauer & Subai 24.09.1989, S 15925/3 + 1 (juv.); forest in rocky gorge near Néa Pandeimónas (= 18 km NW of Stómio), 100 m alt., UTM FK 32, 40.00°N 22.59°E, leg. Gittenberger & Uit de Weerd 24.5.1999, NNM/1 (juv.); Halkidikí Peninsula, 500 m N of Eleohória, on low limestone rocks, 170 m alt., UTM FK 86, 40.3434°N 23.1613°E, leg. Subai 05.05.1995, S 15684/11; Halkidikí Peninsula, in valley beside the cave of Petrálona, 360 m alt., UTM FK 87, 40.3759°N 23.1681°E, leg. Subai 05.05.1995, S 15924/24; leg. Subai 29.5.1997, S 15682/2; rocky mountain slope 11.5 km ESE of Aridéa, NE border of Theodorákio, 450 m alt., UTM FL 03, 40.95°N 22.19°E, leg. Gittenberger & Uit de Weerd 10.5.2000, NNM/2; 500 m W of Gríva (= WSW of Axióupoli), on limestone rocks, 540 m alt., UTM FL 13, 40.9562°N 22.4009°E, leg. Subai & Szekeres

Figs 7–11. *Lindholmiola lens*. Fig. 7: NMBE 515616, Greece, Ilía (= Elis), Alfíós canal between Olimbía and Kréstena (nominotypical form), D = 11.78 mm; Fig. 8: NMBE 515617, Greece, Fokída, Delphi, archaeological site (flat keeled form, broad whorls, wide umbilicus), D = 14.85 mm; Fig. 9: NMBE 515614, Greece, Thessalía, W boundary of Morfovoúni (densely coiled, blunt keel, narrow umbilicus), D = 12.88 mm; Fig. 10: NMBE 515615, Greece, Makedonía, Kassáandra Peninsula, Loutrá (small form, blunt keel, moderately wide umbilicus), D = 7.95 mm; Fig. 11: NMBE 515629, Greece, Makedonía, Canyon 2 Km N of Neohóri (= NE of Aridéa) (flat form, blunt keel, wide umbilicus), D = 14.16 mm. — All photos Neubert/Bochud, × 3.



20.05.1997, S 15683/4; N border of Asvestohóri (= E of Thessaloníki), on dry limestone rocks, 400 m alt., UTM FL 70, 40.6466°N 23.0236°E, leg. Subai & Szekeres 8.05.1997, S 15688/1; between Rizá and Paleohóra (= 12.5 km W of Arnéa), 500 m alt., UTM GK 08, 40.50°N 23.44°E, leg. Gittenberger & Uit de Weerd 22.5.1999, NNM/1 (juv.); Kassándra Peninsula, limestone rocks near Loutrá, near sea, 20–25 m alt., UTM GK 22, 39.9235°N 23.5915°E, leg. Subai 05.05.1995, S 15681/66; Sithonía Peninsula, mountain at S border of Porto Koufós, on limestone rocks in quarry, 30 m alt., UTM GK 42, 39.9576°N 23.9263°E, leg. Subai 06.05.1995, S 15631/1; Sithonía Peninsula, mountain 1.5 km S of Porto Koufós, 10 m alt., UTM GK 42, 39.9494°N 23.9348°E, leg. Subai 05.05.1995, S 15629/110. — Thessalía, E border of Theópetra (= 6 km SE of Kalambáka), surrounding of church, UTM EJ 59, 39.67°N 21.68°E, leg. Fauer 21.8.1982, Maa/7, S 12218/5; Theópetra (= Kuvelci, 6 km SSE of Kalambáka), on limestone blocks of rocks at river bank, 260 m alt., UTM EJ 59, 39.6798°N 21.6810°E, leg. E. & P. Subai 26.07.1975, S 3781/145, 3784/14; leg. Neuteboom 25.7.1979, NNM/2; leg. Gittenberger & Uit de Weerd 25.5.1999, NNM/16 + (alk.); Kalambáka, on conglomerate rocks beside the highway from Kalambáka to the Meteóra monasteries, 280 m alt., UTM EJ 59, 39.7103°N 21.6164°E, leg. Pintér, E. & P. Subai 29.07.1976, S 3785/5; N border of Morfovoúni, on E exposed limestone rocks, 840 m alt., UTM EJ 65, 39.3567°N 21.7464°E, leg. Subai & Szekeres 12.05.1997, S 15928/2 + 1 (juv.); road border in Petrotó, 100 m alt., UTM EJ 87, 39.58°N 21.95°E, leg. Gittenberger & Uit de Weerd 25.5.1999, NNM/4; W border of Petrotó, on low limestone rocks, 120 m alt., UTM EJ 88, 39.5840°N 21.9584°E, leg. Subai, 18.05.1995, S 15691/1 (juv.); 10 km E of Kefalóvrissó, 250 m alt., UTM EK 81, 39.92°N 21.98°E, leg. Gittenberger & Uit de Weerd 25.5.1999, NNM/9; between Elássóna and Deskáti (= 9.5 km W of Elássóna), 250 m alt., UTM EK 91, 39.88°N 22.08°E, leg. Gittenberger & Uit de Weerd 25.5.1999, NNM/2; 17 km W of Lárissa, bifurcation to Temkat, UTM FJ 08, 39.61°N 22.20°E, leg. Eröss 9.8.1993, S, 18258/1; between Tírnavos and Mesohóri, 8 km along road SE of Tírnavos, 125 m alt., UTM FJ 09, 39.71°N 22.24°E, leg. Gittenberger & Uit de Weerd 25.5.1999, NNM/19 + (alk.); road border 1 km W of Damássi, 150 m alt., UTM FJ 09, 39.71°N 22.16°E, leg. Gittenberger & Uit de Weerd 25.5.1999, NNM/1; between Tírnavos and Damássi, crossing to Tríkala, on low limestone rocks, 120 m alt., UTM FJ 09, 39.6991°N 22.2134°E, leg. Pintér, E. & P. Subai 28.07.1976, HNHM 85641/1, S 3782/16; 1 km E of Fársala, UTM FJ 15, 39.28°N 22.40°E, leg. Kiss & Pintér 8.7.1986, HNHM 29905/6; 37.5 km SSE of Lárissa, on limestone rocks 3.5 roadkm. bevor Fársala, 200 m N of road Domokós–Lárissa, 425 m alt., UTM FJ 15, 39.28°N 22.32°E, leg. Gittenberger & Uit de Weerd 21.5.2000, NNM/1; 2 km E of Fársala (= direction Ambelía), UTM FJ 25, 39.30°N 22.41°E, leg. Neuteboom 21.7.1979, NNM/2; Míra, N slope, on rocks, UTM FJ 25, 39.45°N 22.54°E, leg. Neuteboom 21.7.1979, NNM/1; Míra, path to Sofó, UTM FJ 36, 39.45°N 22.53°E, leg. Neuteboom 21.7.1979, NNM/12; 6 km SE of Almirós, W border of junction, 25 m alt., UTM FJ 53, 39.14°N 22.82°E, leg. Gittenberger & Uit de Weerd 29.5.1999, NNM/24; 3 km S of Aerinó, W rim of highway, 150 m alt., UTM FJ 55, 39.30°N 22.74°E, leg. Gittenberger & Uit de Weerd 29.5.1999, NNM/4; Néa Ionía (= Vólos, Volo), UTM FJ 65, 39.38°N 22.92°E, HNHM 39177/3, SMF 101969/5; leg. Stussiner, 1886, SMF 101964/4; leg. C. R. Boettger, 1906, SMF 101978/2; Néa Ionía, near of beach, UTM FJ 65, 39.34°N 22.92°E, leg. Schütt, 19.5.1962, SMF 279326/7; road border 500 m E of Ahíllio (= Akhilion), 25 m alt., UTM FJ 71, 39.01°N 22.97°E, leg.



Figs 12–14. 12: Genital organs of *Lindholmiola* species. Fig. 12: *Lindholmiola lens*, a: situs, Greece, Ilía (= Elis) between Olimbía and Kréstena, b: lumina of genital organs, Greece, Ahaïa, 3 Km S of Ptéri; Fig. 13: *Lindholmiola spectabilis*, a: situs, b: lumina of genital organs, Greece, Makedonía, Falakró Mts., Ágios Pnevma plateau; Fig. 14: *Lindholmiola girva*, a: situs, b: lumina of genital organs, Greece, Makedonía, Taxiárhis.

Gittenberger & Uit de Weerd 29.5.1999, NNM/12; surroundings of Agía Kiriakí Village (= 32 km SE of Néa Ionía), 50–100 m alt., UTM FJ 72, 39.09°N 23.07°E, leg. Gittenberger & Uit de Weerd 28.5.1999, NNM/6; 1 km E of Agriá (= 5 km ESE of Néa Ionía), 125 m alt., UTM FJ 75, 39.33°N 23.04°E, leg. Gittenberger & Uit de Weerd 26.5.1999, NNM/9; SE border of Néa Ionia (= Volos) W of the freight harbor, on rocks, among weeds, UTM FJ 75, 39.3492°N 22.9768°E, leg. Subai 30.04.1991, S 15926/11; Makrinítsa at Pílio [Mountains], UTM FJ 76, 39.40°N 22.98°E, leg. Stussiner, 1887, SMF 284934/3,

284955/1; 500 m SSW of Makrinítsa, 275 m alt., UTM FJ 76, 39.39°N 22.97°E, leg. Gittenberger & Uit de Weerd 27.5.1999, NNM/33; Pílio (= Pelion) [Mountains], UTM n. det., SMF 101870/20; foot of Pílio [Mountains] (= Pílios), UTM n. det., leg. Stussiner, 1888, SMF 284933/3; Pílio, 10 min. below peak, UTM FJ 76, 39.43°N 23.04°E, leg. Stussiner, 1888, SMF 284931/4; Pílio, 1 hour below peak, UTM FJ 76, 39.42°N 23.05°E, leg. Stussiner, 1888, SMF 284932/2; Survias monastery, N side of Pílio, UTM FJ 76, 39.4620°N 22.9847°E, leg. Stussiner, 1888, SMF 284935/2; 4 km above Portaria (= direction Hánia), karst slope, 840 m alt., UTM FJ 76, 39.3704°N 23.0290°E, leg. Subai & Szekeres 9.05.1997, S 15929/2 + 1 (juv.) + 1 (alk.); near Hánia (= ENE of Néa Ionia = Volos), in forest beside the Hotel "Hani Zisi", in leaf litter, 1150 m alt., UTM FJ 76, 39.3949°N 23.0619°E, leg. Subai & Szekeres 9.05.1997, S 15913/2 (juv.) + 11 (alk.); road border at Kóttēs (= 30.5 km SE of Néa Ionía), 70 m alt., UTM FJ 83, 39.11°N 23.09°E, leg. Gittenberger & Uit de Weerd 28.5.1999, NNM/7; 4 km WSW of Marathéa (= 32 km SE of Néa Ionía), 15 m alt., UTM FJ 83, 39.11°N 23.12°E, leg. Gittenberger & Uit de Weerd 28.5.1999, NNM/35 + 7 + (alk.); Olimbos (= Olympos) [Mountain], UTM n. det., leg. Maltzan, 1883, SMF 284954/1; leg. Mahunka 15.9.1984, HNHM 23886/14 + 8 (juv.); Témbi (= Tempe valley, approx. 30 km NE of Lárissa), on limestone rocks, UTM FK 31, 39.87°N 22.58°E, leg. Stussiner, 1884, SMF 284939/4; Témbi (= Tempe valley, approx. 30 km NE of Lárissa), on limestone rocks and from the "Daphne" spring, UTM FK 31, 39.8796°N 22.5870°E, leg. Pintér, E. & P. Subai 28.07.1976, HNHM 39188/12, S 3783/14 + 1 (juv.); leg. Neuteboom, 19.7.1979, NNM/2 + 3; leg. Maassen 7.1980, Maa/3 + 26; leg. Subai 24.7.1990, S 15927/5; small valley along old road 500 m SW of Omólion (= Moli), 50 m alt., UTM FK 31, 39.89°N 22.63°E, leg. Gittenberger & Uit de Weerd 26.5.1999, NNM/1; Ossa Mountains, Profítis Ilías peak region, on marble rocks, 1550 m alt., UTM FK 40, 39.7948°N 22.6710°E, leg. Subai 23.07.1990, S 15930/4 + 1 (juv.); Ossa Mountains, Bugari Valley, UTM n. det., leg. Stussiner, leg., SMF 284938/2; Thessaloníki (= Saloniki), UTM n. det., leg. Hausknecht, 1885, SMF 284941/1; Langadás near Thessaloníki, UTM FL 71, 40.74°N 23.06°E, SMF 207803/9. — Fthiótida, plane between Brálos and Parnassós [Mountains], UTM FH 28, 38.69°N 22.45°E, leg. Pfeiffer, 1926, SMF 101876/6; Brálos–Loutrá Thermopilón highway, 8 km from bifurcation Moni Damasta direction Loutrá Thermopilón, on rocks, 110 m alt., UTM FH 29, 38.8008°N 22.4973°E, leg. Subai 10.04.1986, S 15795/1; entrance of gorge at SE border of Amfíklia, in the vicinity of a small chapel, on limestone rocks, 500 m alt., UTM FH 37, 38.6306°N 22.5963°E, leg. Subai 10.04.1986, S 15696/2; Loutrá Thermopilón, monument, UTM FH 39, 38.79°N 22.53°E, leg. Kiss & Pintér 9.7.1986, HNHM 29917/1; gorge W of Tithoréa and in the big cave, 850 m alt., UTM FH 47, 38.5702°N 22.6602°E, leg. Subai 11.04.1986, S 15694/4; SW border of Atalánti, on limestone rocks, 190 m alt., UTM FH 77, 38.6534°N 22.9849°E, leg. Subai 11.04.1986, S 15695/3; Atalánti (= Atalandi), UTM FH 78, 38.65°N 22.99°E, SMF 284950/4; leg. Thiesse, 1890, SMF 284897/6, 284937/6; leg. Clessin, 1879, SMF 101859/1; Ipáti, on limestone rocks beside the waterfall, 380 m alt., UTM FJ 00, 38.8710°N 22.2440°E, leg. Subai 16.05.1991, S 15711/2; 1.5 km NE of Lamía (= highway direction Lárissa), stone mine beside Xerias river, on limestone rocks, 615 m alt., UTM FJ 20, 38.9673°N 22.3874°E, leg. Subai 10.04.1986, S 15697/6; 9 km from Glífa direction Pelasgía, on limestone rocks, 100 m alt., UTM FJ 61, 38.9309°N 22.9229°E, leg. Subai 30.04.1991, S 15706/19. — Etoloakarnanía, Veloútsa Mountain SE slope above Astakós, on lime-

stone rocks, approx., 185 m alt., UTM EH 06, 38.5370°N 21.0692°E, leg. Subai, 19.05.1991, S 15715/3; Messolóngi, UTM EH 34, 38.37°N 21.43°E, leg. Krüper, 1901, SMF 101866/4; above Kefalóvrissos, on limestone rocks, 30 m alt., UTM EH 35, 38.4598°N 21.3670°E, leg. Fauer & Subai 30.09.1989, S 15736/18; ruins of Ancient Kalydon (= 2 km from Evinos bridge direction Messolóngi), under stones, UTM EH 44, 38.3725°N 21.5332°E, leg. Fauer & Subai 01.10.1989, S 15732/42; Krionéri, on limestone rocks on Varásova Mountain, SW slope, 50–220 m alt., UTM EH 54, 38.3477°N 21.5973°E, leg. Fauer & Subai 01.10.1989, S 15731/5; in Riza village, on limestone rocks and mountain slope W of Riza, beside the old road to Messolóngi, 70 m alt., UTM EH 64, 38.3541°N 21.6978°E, leg. Fauer & Subai 02.10.1989, S 15735/13; Náfpaktos (= Lepanto), UTM EH 74, 38.39°N 21.82°E, SMF 285762/7; leg. Krüper SMF 101895/23, 101898/6; leg. Thiesse, 1890, SMF 284956/6; on limestone rocks in Náfpaktos, 20 m alt., UTM EH 74, 38.3929°N 21.8259°E, leg. Pintér, E. & P. Subai 31.07.1976, HNHM 39184/2 + 3 (juv.), S 3799/3. — Fokída, mountain W of Glifáda (= opposite of Trizónia Island), on limestone rocks, 100 m alt., UTM EH 94, 38.3883°N 22.0711°E, leg. Subai 14.04.1986, S 15720/5; leg. Kiss & Pintér 23.7.1986, HNHM 29900/8 + 6 (juv.); leg. Riedel & Subai 15.4.1988, S 15739/36; border of Ágios Spirído Village (= E of Glifáda), on dry limestone rocks, 30 m alt., UTM EH 94, 38.3679°N 22.1169°E, leg. Fauer & Subai 01.10.1989, S 15734/16; 6 km from Erátini direction Náfpaktos, on rocks at sea shore, 40 m alt., UTM FH 04, 38.3316°N 22.1907°E, leg. Subai 14.04.1986, S 15723/5; 4 km S of Malandrino (= S of Lidoríki), on limestone rocks, 550 m alt., UTM FH 05, 38.4178°N 22.2498°E, leg. Subai 13.4.1986, S 15730/7; approx. 200 m from the crossing Lidoríki–Erátini–Amfissa direction Amfissa, on limestone rocks, 640 m alt., UTM FH 15, 38.4052°N 22.2550°E, leg. Fauer & Subai 01.10.1989, S 15733/8; 9 km from Mórnoú dam direction Lévká, W side of a peninsula on S banks of the dam reservoir, on limestone rocks, 550 m alt., UTM FH 06, 38.5342°N 22.1634°E, leg. Subai 13.04.1986, S 15729/3; 3 km from Penteória direction Erátini, on limestone rocks, 750 m alt., UTM FH 15, 38.4155°N 22.2967°E, leg. Subai 14.04.1986, S 15722/8; Lidorikíou Mountains, 28 km from Amfissa direction Lidoríki (= 19 km S of Lidoríki), 600 m alt., UTM FH 15, 38.3992°N 22.2696°E, leg. Subai 13.04.1986, S 15728/2; 7.5 km from Itéa direction Galaxídi, UTM FH 25, 38.42°N 22.39°E, leg. Neuteboom 22.7.1979, NNM/8 + 1 (juv.); 2 km S of Ámfissa (= direction Vouníhora), on limestone rocks, 300 m alt., UTM FH 26, 38.5087°N 22.3821°E, leg. Subai 16.05.1991, S 15718/16; Eptálofos (= Agóriani), Parnassós Mountains, UTM FH 27, 38.59°N 22.49°E, SMF 284867/3; leg. Krüper, 1888, SMF 101984/4; leg. Krüper, 1899 and, 1901, SMF 101923/8; leg. Schlüter, 1888, SMF 284864/1; 2.5 km of Graviá direction Amfissa, on limestone rocks, 540 m alt., UTM FH 27, 38.6607°N 22.4253°E, leg. Subai 12.04.1986, S 15737/4; E-exponated rocks at S border of Marioláda, 450 m alt., UTM FH 27, 38.65°N 22.46°E, leg. Gittenberger & Uit de Weerd, 19.5.2000, NNM/18; 2 km SE von Marioláda, an Kalkfelsen, 780 m alt., UTM FH 27, leg. Gittenberger & Uit de Weerd, 19.5.2000, NNM/5; E border of Desfína, UTM FH 35, 38.41°N 22.53°E, leg. Hoenselaar 27.5.1996, Maa/2; NE of Delfí, ruins of ancient Delphi, 650 m alt., UTM FH 36, 38.4824°N 22.4981°E, SMF 207815/9; leg. Müller, SMF 285174/1; leg. Krüper, SMF 101896/7; leg. Pfeiffer, 1926, SMF 101892/3, 101893/10, 101894/1; leg. Schütt 4.6.1969, S 3798/3; leg. Neuteboom 22.7.1979, NNM/7 + 3 (juv.); leg. Drimmer 23.5.1982, HNHM 33703/5; leg. Podani 30.7.1984, HNHM 21467/3; leg. Neuteboom

26.10.1984, NNM/3; leg. Perjesi 29.4.1985, HNHM 23902/1; leg. Kiss & Pintér 23.7.1986, HNHM 29895/18 + 2 (juv.); leg. Sín 6.7.1987, HNHM 44341/5 + 3 (juv.); leg. Eröss 6.4.1989, S, 18259/3; leg. Subai 16.5.1991, S 15719/35; leg. Hoenselaar 26–27.5.1996, Maa/1 + 2; 2.5 km E of Amfíklia, UTM FH 37, 38.64°N 22.62°E, leg. Neuteboom 25.10.1984, NNM/1 + 2 (juv.); Polídrosos, UTM FH 37, 38.63°N 22.53°E, leg. Neuteboom 25.10.1984, NNM/1; Parnassós Mountains (= Parnass), UTM n. det., SMF 101858/7, 101882/1; leg. Krüper, 1883, SMF 101872/3; leg. Schmidt, 1935, SMF 101878/3; Parnassós Mountains, tree-line 1.7 km of ski-lift, UTM FH 46, 38.55°N 22.57°E, leg. Neuteboom 23.7.1979, NNM/2 + 3 (alk.). — Viotía, Tríodos, bifurcation after Dístomo, UTM FH 45, 38.44°N 22.68°E, leg. Neuteboom 23.7.1979, NNM/25 km from the crossing Dístomo–Delfí–Livadiá direction Livadiá, on limestone rocks, 310 m alt., UTM FH 45, 38.4627°N 22.7161°E, leg. Subai 14.04.1986, S 15794/1; Elikón Mountains, 6 km from Kiriáki direction Dístomo and 4 km southward on a small path, upper border of a gorge, on limestone rocks, 100 m alt., UTM FH 54, 38.3625°N 22.7208°E, leg. Subai 14.04.1986, S 15721/1; 3 km from Paralía Sarandi direction Pródromos, on limestone rocks and in debris among rocks, 220 m alt., UTM FH 63, 38.2572°N 22.8756°E, leg. Subai 15.04.1986, S 15725/14; 4.3 km from Paralía Sarandi direction Pródromos, on limestone rocks and in an olive tree plantation, 225 m alt., UTM FH 63, 38.2578°N 22.8826°E, leg. Subai 15.04.1986, S 15724/5; rock gorge at SE border of Livadiá, on limestone rocks and in organic flotsam of creek, 220 m alt., UTM FH 65, 38.4329°N 22.8920°E, leg. Subai 15.04.1986, S 15796/13; Lafísti (= Lofistion, E of Livadiá), on limestone rocks, 310 m alt., UTM FH 65, 38.4281°N 22.9189°E, leg. Subai 11.04.1986, S 15799/3; Herónia, ancient theatre 6 km NW of Livadiá, 250 m alt., UTM FH 66, 38.49°N 22.84°E, leg. Gittenberger & Uit de Weerd, 19.5.2000, NNM/1; 2 km E of Alíartos, on limestone rocks, approx. 80 m beside highway, 115 m alt., UTM FH 84, 38.4351°N 23.1997°E, leg. Riedel & Subai 09.04.1988, S 15761/1 + 3 (juv.); 13 km W of Thíva, 9.9 roadkm. of Alíartos additional 2 km on a secondary road, 250 m alt., UTM FH 94, 38.33°N 23.14°E, leg. Gittenberger & Uit de Weerd 20.5.2000, NNM/5; on limestone rocks beside the motor way, at the bifurcation to Akréfnio (= 5.5 km SE of the crossing near Kástro), 120 m alt., UTM FH 95, 38.4500°N 23.2092°E, leg. Subai & Szekeres 11.05.1997, S 15813/6; 7 km N of Thíva, on rocks 1 roadkm. along a secondary road to Movríki, UTM GH 05, 38.38°N 23.32°E, leg. Gittenberger & Uit de Weerd 20.5.2000, NNM/2 + 1 (juv.); Skoponéri Village, about 50 m S of the tavern, on low limestone rocks, approx. 10 m alt., UTM GH 06, 38.5032°N 23.3549°E, leg. Subai & Szekeres 11.05.1997, S 15690/47 + 2 (juv.) + 9 (alk.); above Skoponéri, E border of the village, on limestone rocks, 270 m alt., UTM GH 06, 38.5013°N 23.3675°E, leg. Subai & Szekeres 11.05.1997, S 15689/8 + 1 (juv.); mountain slope 10 km from Halkída (= Chalkis) direction Thiva (= Thebe), on limestone rocks, 270 m alt., UTM GH 25, 38.4282°N 23.5309°E, leg. Riedel & Subai 09.04.1988, S 15698/7. — Atikí (= Attika), UTM n. det., SMF 284881/7, 284893/2, 284894/1, 284980/3; leg. Krüper, 1883, SMF 101861/8; approx. 8.5 km from Paralía Shínou direction Káto Alepohóri, on limestone rocks, approx. 10 m alt., UTM FH 81, 38.0514°N 23.0571°E, leg. Subai 14.05.1991, S 15712/7 + 1 (juv.); Aigósthena (= Porto Germeno), on rocks below the castle ruins, 45 m alt., UTM FH 92, 38.1483°N 23.2321°E, leg. Subai 16.05.1991, S 15693/2 (fragment); 11 km from the highway Vília–Aigósthena direction Kithairón peak, on limestone rocks, 1300 m alt., UTM FH 92, 38.1835°N 23.2583°E, leg. Subai 16.05.1991, S

15915/7 + 1 (juv.); Vouliagméni (= opposite of Fléves Island), on limestone rocks beside the highway, 20 m alt., UTM GG 48, 37.8086°N 23.7841°E, leg. Subai, 19.07.1979, S 15701/51; 3.4 km SE of Varkíza (= coast road direction Agía Marína), on limestone rocks, 30 m alt., UTM GG 48, 37.8127°N 23.8314°E, leg. Subai 07.05.1991, S 15705/1 (fragment); "Varkíza Beach" camping near Varkíza, on limestone rocks, 30 m alt., UTM GG 48, 37.8226°N 23.8170°E, leg. Subai 20.07.1979, S 6644/10; 3 km from Vári direction Koropí, on limestone rocks, 50 m alt., UTM GG 49, 37.8415°N 23.8215°E, leg. Subai 20.07.1979, S 6700/2; coastal strip near Paleá Fókaia, UTM GG 57, 37.71°N 23.94°E, leg. Neuteboom 20.10.1984, NNM/1; 3 km N of Legrená, UTM GG 67, 37.69°N 24.00°E, leg. Neuteboom 20.10.1984, NNM/3; coast near Megara, UTM GH 00, 37.97°N 23.32°E, leg. Pfeiffer, 1926, SMF 101844/1; Sborder of Megara, UTM GH 00, 37.97°N 23.35°E, leg. Kiss & Pintér, 19.7.1986, HNHM 29918/2 + 1 (juv.); mountain slope at W border of Mégara, on limestone rocks, 65 m alt., 37.9962°N 23.3240°E, UTM GH 00, leg. Subai 07.07.1979, S 6515/2 + 2 (juv.); mountain slope beside Ágios Ierothéou monastery (= W of Mégara), 300 m alt., UTM GH 01, 38.093°N, 23.2677°E, leg. Subai 07.07.1979, S 15702/11 + 1 (juv.); 3.5 km from the highway Vília–Aigósthena direction Kithairón peak, rocks in coniferous forest, 850 m alt., UTM GH 02, 38.1706°N 23.2728°E, leg. Subai 16.05.1991, S 15692/2 (fragment); Elefsína–Thíva country road, mountain behind Mándra, UTM GH 11, 38.08°N 23.48°E, leg. Pfeiffer, 1926, SMF 101875/4; Pérama, on rocks at coastal strip direction Piráeus, UTM GH 20, 37.96°N 23.60°E, leg. Neuteboom 4.9.1982, NNM/1; Elefsína, dry mountain slope beside a quarry, 130 m alt., UTM GH 21, 38.0508°N 23.4950°E, leg. Subai 07.07.1979, S 6559/1; Athína (= Athen), UTM n. det., SMF 284878/9, 284879/2, 284946/2; leg. Krüper, 1883, SMF 101863/5, 101972/11; leg. Heldreich, SMF 284882/3; Piráeus, UTM GH 30, 37.94°N 23.63°E, leg. Krüper, 1883, SMF 101983/3; Athína, Paleo Falíro (= Phaleron, part of Athína), UTM GH 30, 37.92°N 23.70°E, leg. Krüper, SMF 101975/39; Athína, Akropolis, UTM GH 30, 37.97°N 23.72°E, leg. Pfeiffer, 1926, SMF 101843/24; Párnis Mountain (= Parnés) Chasia, UTM n. det., leg. Krüper, 1883, SMF 101971/1; W side of Párnitha Mountain (= N of Athína), river valley along the circular path on top of the mountain, on limestone rocks, 1000 m alt., UTM GH 32, 38.1631°N 23.7020°E, leg. Subai 21.04.1988, S 15916/13; SW border of Avlóna, on limestone rocks, 300 m alt., UTM GH 33, 38.2454°N 23.6855°E, leg. Subai 16.04.1986, S 15801/2; leg. Riedel & Subai 9.4.1988, S 15804/15; leg. Gittenberger & Uit de Weerd 20.5.2000, NNM/13; Likavittós (= Lykabettos) Mountain in Athína, on limestone rocks, UTM GH 40, 37.98°N 23.74°E, SMF 101874/2, 285169/24, 285170/2; leg. Krüper, 1883, SMF 101860/1; leg. Heldreich, SMF 284892/3; leg. Coneménos, 1889, SMF 284886/9; leg. Krüper, 1888, SMF 101985/9; leg. Pintér 21.8.1976, HNHM 39181/2 + 1 (juv.); leg. Perjesi 22.4.1985, HNHM 23890/1; top of Likavittós Mountain in Athína, on limestone rocks, 250 m alt., UTM GH 40, 37.9826°N 23.7436°E, leg. Subai, 19.7.1979, S 6249/12; leg. Subai 22.04.1988, S 15704/2; Hyméttos Mountain, UTM GH 40, 37.96°N 23.81°E, leg. Schmidt, SMF 285168/2; leg. Köhler, SMF 285167/2; leg. Knobbe, SMF 284885/2; leg. Brenske, 1883, SMF 101963/2, 284888/2; leg. Krüper, 1883, SMF 101862/6; leg. Krüper, 1899, SMF 101967/10; leg. Pfeiffer, 1926, SMF 101954/1; N side of mount Hyméttos, on limestone rocks, approx. 800 m alt., UTM GH 40, 37.9604°N 23.8162°E, leg. Subai 4.4.1986, S 15713/5 + 1 (juv.) 15714/100 + 3 (juv.); leg. Subai 21.4.1988, S 15710/3; Kifissía (= Kephissia), UTM GH 41, 38.07°N 23.82°E, leg. Pfeiffer, 1926, SMF

101886/3; mountain SW of Anatolí (= W of Néa Mákri), on limestone rocks, approx. 200 m alt., UTM GH 51, 38.0895°N 23.9468°E, leg. Subai 02.05.1991, S 15808/14; Pendéli (= Pentelikon) [Mountains], UTM n. det., SMF 207814/2; leg. Krüper, SMF 101974/40; leg. Pfeiffer, 1926, SMF 101888/1; Pendéli monastery, UTM GH 51, 38.05°N 23.86°E, leg. Pfeiffer, 1926, SMF 101887/1; approx. 4 km NE of Pendéli, Pendéli (= Pentelikon) Mountains W side, on crystalline rocks, 700 m alt., UTM GH 51, 38.0653°N 23.9081°E, leg. Subai 02.05.1991, S 15809/12; Soúnio, UTM KB 37, 37.65°N 24.02°E, leg. Pfeiffer, 1926, SMF 101885/29; 4 km from Lavrio direction Markópoulo, on limestone rocks, 125 m alt., UTM KB 38, 37.7523°N 24.0260°E, leg. Subai 05.05.1991, S 15703/15; road Athína–Soúnio, before Lavrio, UTM KB 48, 37.74°N 24.05°E, KB 38, leg. Pfeiffer, 1926, SMF 101884/5; road Athína–Marathónas, UTM n. det., leg. Pfeiffer, 1926, SMF 101890/9; road Athína–Soúnio, UTM n. det., leg. Pfeiffer, 1926, SMF 101883/7. — Égina Island, UTM n. det., SMF 207811/2; Mesagrós, Aphaia holy place, UTM GG 28, 37.75°N 23.53°E, leg. Eröss 5.4.1989, S, 18261/10. — Méthana Island, Méthana Town, UTM GG 25, 37.58°N 23.39°E, leg. Haussknecht, 1885, SMF 284887/2. — Kíthira Island (= Cerigo), "Keramoto", UTM n. det., leg. Krüper, 1893, SMF 101869/8, 284913/2. — Kefaloniá Island, UTM n. det., HNHM 39171/1, 39175/2, 39179/2, SMF 101857/6, 101881/4, 84910/9, 284911/1; leg. Müller, SMF 285162/2; Argostóli Peninsula, UTM DH 52, 38.18°N 20.48°E, leg. Visser 1.11.1985, NNM/1 (alk.). — Zakynthos Island (= Zante), UTM n. det., SMF 284884/5; above Chilionomenon, UTM n. det., HNHM 39236/3 + 1 (juv.). — Ilía (= Elis), theatre 15 km E of Gastoúni, UTM EG 39, 37.89°N 21.37°E, leg. Hoenselaar 17.4.1996, Maa/5; Kaíafás (= NW of Zaháro), on limestone rocks and from the thermal well, UTM EG 55, 37.5193°N 21.6022°E, leg. Subai 07.04.1986, S 15798/11; ruins of Arhea Olympia, 35 m alt., UTM EG 56, 37.6384°N 21.6307°E, HNHM, 18649/1; SMF 279327/4, 284900/10, 285173/6; leg. Schlüter, SMF 284901/15; leg. Pfeiffer, 1926, SMF 101851/7; leg. Kühnel 4.1933, HNHM 9784/2; leg. Hansen, 1937, HNHM 39187/2; leg. Jaeckel, 1958, SMF 207816/10; leg. Seidl 3.10.1965, NNM/4; leg. Guyat & Dawber 8.1973, HNHM 85645/1, S 3793/12; leg. Pintér & Subai 2.8.1976, S 3494/61; leg. Sin 4–5.7.1985, HNHM 24029/17 + 3 (juv.), 24069/25 + 4 (juv.); leg. Kiss & Pintér 23.7.1986, HNHM 29897/9 + 3 (juv.); leg. Hoenselaar, 19.4.1996, Maa/7; between Arhea Olympia and Kréstena, beside the channel of Alfiós River, in grass and under stones, UTM EG 56, 37.6279°N 21.5923°E, leg. Subai 10.07.1979, S 15882/36 + 17 (alk.); Giannitsohóri, Camping "Apollo", UTM EG 63, 37.39°N 21.69°E, leg. Hoenselaar 21–23.4.1996, Maa/2 + 3; river gorge approx. 1.5 km E of Néa Figália, on limestone rocks, approx. 550 m alt., UTM EG 64, 37.4469°N 21.7890°E, leg. Riedel & Subai, 18.04.1988, S 15762/1; road Tholon–Andrítsena, border of Lépreo, UTM EG 64, 37.43°N 21.72°E, leg. Hoenselaar 22.4.1996, Maa/2; Koumanis (= Kumani), UTM EG 68, 37.79°N 21.74°E, SMF 225648/3; river gorge between the two bifurcations of the Lámbia–Tripótama highway to Orini, on limestone rocks, 630 m alt., UTM EG 79, 37.8608°N 21.8612°E, leg. Riedel & Subai 17.04.1988, S 15760/9; leg. Hadjicharalambous & Subai 12.5.1991, S 15756/1. — Ahaia, 4.1 km from the crossing Kalávrita–Trípoli–Tripótama direction Tripótama, on limestone rocks, 1120 m alt., UTM EG 99, 37.8992°N 22.0087°E, leg. Hadjicharalambous & Subai 14.05.1991, S 15716/5; dry meadow 2 km S of Klitoria (= direction Trípoli), 500 m alt., UTM EG 99, 37.8808°N 22.1355°E, leg. Subai 09.07.1979, S 15738/3; Araxos, on limestone rocks beside the stone mine at banks of Lake Kalogera, 20 m alt., UTM EH

32, 38.1642°N 21.4011°E, leg. Subai 07.04.1986, S 15727/9; Skollis Mountain W slope above Sandoméri, on limestone rocks, in rock debris, 550 m alt., UTM EH 40, 37.9899°N 21.5781°E, leg. Riedel & Subai 16.04.1988, S 15766/4; W slope of Skollis Mountain, NE of Sandoméri, on limestone rocks, 530 m alt., UTM EH 50, 37.9929°N 21.5778°E, leg. Subai 07.04.1986, S 15797/9; Erímanthos Mountains above Kaléntzi, on limestone rocks, 1060 m alt., UTM EH 60, 37.9447°N 21.7650°E, leg. Hadjicharalambous & Subai 13.05.1991, S 15921/4; Pátra (= Patras), UTM EH 63, 38.24°N 21.74°E, SMF 284890/2, 284908/5, 284953/4; leg. Coneménos, SMF 101854/5; leg. Brenske, 1883, SMF 101968/6; leg. Krüper, 1895, SMF 284960/6; leg. Krüper, 1899, SMF 101952/11; leg. C. R. Boettger, 1905, SMF 101979/5; Psathópirgos, UTM EH 74, 38.32°N 21.87°E, SMF 225650/19 + 20; river valley near Psathopírgos, among dry plants and on rocks (no limestone !), 230 m alt., UTM EH 74, 38.3183°N 21.8823°E, leg. Subai 07.04.1986, S 15726/5; in a dry river bed S of Flámpoura village (= Metohi), 900 m alt., UTM EH 81, 38.0286°N 21.9965°E, leg. Pintér, E. & P. Subai 01.08.1976, S 3791/8, HNHM 39170/5; bifurcation of the highway Kalávrita–Diakoftó to Rogí, Kerpíní, on limestone rocks, 700 m alt., UTM EH 91, 38.0534°N 22.1384°E, leg. Hadjicharalambous & Subai 13.05.1991, S 15717/3; river gorge 3 km S from Ptéri, on limestone rocks and under stones, 1150 m alt., UTM EH 92, 38.1418°N 22.0710°E, leg. Riedel & Subai 15.04.1988, S 15920/3 + 1 (juv.) + 2 (alk.); leg. Fauer & Subai 3.10.1989, S 15919/9; leg. Hadjicharalambous & Subai 13.05.1991, S 15780/1; in and around the cave N of Kastría, on limestone rocks, 840 m alt., UTM FH 00, 37.9603°N 22.1404°E, UTM FH 00, leg. Hadjicharalambous & Subai 14.05.1991, S 15778/2; on rocks and on walls of Mega Spileo monastery (= N of Kalávrita), 950 m alt., UTM FH 01, 38.0884°N 22.1746°E, leg. Pintér, E. & P. Subai 01.08.1976, S 3792/3; Subai 9.7.1979, S 6577/1; in "Lemon Beach" camping near Paralia Akráta, under stones, UTM FH 12, 38.1653°N 22.3408°E, leg. Subai 09.07.1979, S/2 (alk.); Nezerá, UTM n. det., leg. Coneménos, SMF 225649/2. — Korinthía, Killini Mountains, in spruce forest above Goúra, on limestone rocks, 1100 m alt., UTM FG, 19, 37.9347°N 22.3488°E, leg. Subai 08.07.1979, S 6428/1 + 2 (juv.); Killini Mountains, 7.5 km from Goúra direction Kastanéa, on limestone rocks, 800 m alt., UTM FG, 19, 37.8866°N 22.3408°E, leg. Subai 08.07.1979, S 6573/2; Oligirtos Mountains, 1 km from Kartéri direction Goúra, on limestone rocks and in cave crevices, 850 m alt., UTM FG 29, 37.8510°N 22.3996°E, leg. Subai 08.07.1979, S 15750/2; Killini Mountains, mountain slope 6 km from Kaliáni direction Kiáto, on conglomerate rocks, 710 m alt., UTM FG 39, 37.9236°N 22.5262°E, leg. Subai 08.07.1979, S 6661/2; 1 km S of Neméa, on limestone rocks, 370 m alt., UTM FG 48, 37.8024°N 22.6670°E, leg. Hadjicharalambous & Subai 07.05.1991, S 15781/2; ancient Neméa (= near Arhéa Neméa), UTM FG 58, 38.82°N 22.66°E, leg. Hoenselaar 22.5.1996, Maa/5; 8.5 km from Ágios Vassílios direction Árgos, on limestone rocks, 290 m alt., UTM FG 58, 37.7779°N 22.7339°E, leg. Subai, 18.07.1979, S 6561/2 + 1(juv.); ruins of Arhea Kórinthos, 80 m alt., UTM FG 69, 37.9059°N 22.8792°E, SMF 284951/6; leg. Brenske, 1883, SMF 284920/1; leg. Krüper, SMF 101853/5; leg. Pfeiffer, 1926, SMF 101845/6; leg. Pintér & Subai 6.08.1976, HNHM 39172/4, S 3795/4; leg. Nosek 3.10.1976, HNHM 21461/2; leg. Hoenselaar 23.5.1996, Maa/2; road to Akrokorinthos, UTM FG 69, 37.89°N 22.87°E, leg. Pfeiffer, 1926, SMF 101846/1 + 4 (juv.); leg. Neuteboom 29.8.1982, NNM/1; ruins of the old castle of Akrokorinthos, 400 m alt., UTM FG 69, 37.8900°N 22.8690°E, SMF 285172/2; leg. Schlüter 27.4.1912,

SMF 285765/8; Tomlin, 1904, SMF 284889/1; leg. Subai, 18.7.1979, S 15744/57 + 1 (alk.); leg. Kiss & Pintér 21.8.1988, HNHM 44600/24 +, 18 (juv.); leg. Neuteboom 29.8.1982, NNM/11 + 3 (juv.); highway Epidauros–Kórinthos, 8 km from the bifurcation to Sofikó direction Epidauros, 230 m alt., UTM FG 87, 37.7334°N 23.1010°E, leg. Pintér, E. & P. Subai 06.08.1976, HNHM 39182/2 + 1 (juv.), S 3796/2; Kórfos, UTM FG 88, 37.76°N 23.12°E, leg. Kiss & Pintér 16.8.1988, HNHM 85644/7; 2 km S of Kórfos, UTM FG 88, 37.73°N 23.12°E, leg. Kiss & Pintér, 19.7.1986, HNHM 29909/1 (juv.); N exposed lime hill slope between Ano Loutró and Kariá, 550 m alt., UTM FH 31, 38.0842°N 22.5403°E, leg. Fauer & Subai 03.10.1989, S 15740/1; ruins of Heraion and on limestone rocks beside Lake Heraiou, 60 m alt., UTM FH 61, 38.0349°N 22.8708°E, leg. Subai, 18.07.1979, S 6352/13 + 3 (alk.); Loutráki, UTM FH 70, 37.98°N 22.97°E, leg. Krüper, SMF 101973/10; leg. Butot & Subai, 19.2.1981, S 17540/12 + 3 (alk.); leg. Kiss & Pintér, 19.7.1986, HNHM 29901/18 + 7 (juv.); leg. Eröss 22.7.1992, S, 18257/1; dry mountain slope at NW border of Loutráki, on limestone rocks, 80 m alt., UTM FH 70, 37.9836°N 22.9715°E, leg. Subai 07.07.1979, S 15751/15; W border of Perahóra, UTM FH 71, 38.02°N 22.94°E, leg. Kiss & Pintér 16.8.1988, HNHM 44685/15 + 6 (juv.); 1 km S of Perahóra, UTM FH 71, 38.01°N 22.94°E, leg. Kiss & Pintér 16.8.1988, HNHM 44589/6 + 1 (juv.); approx. 1.5 km from Paralía Shínou direction Káto Alepohóri, on limestone rocks, approx. 100 m alt., UTM FH 81, 38.0570°N 23.0055°E, leg. Subai 14.05.1991, S 15914/10. — Arkadía, 1 km from Stavrodrómio direction Arhea Olympia (= highway Arhea Olympia–Trípoli), 630 m alt., UTM EG 87, 37.6989°N 21.9392°E, leg. Pintér, E. & P. Subai 02.08.1976, S 3775/10; 2 km from Langádia direction Arhea Olympia (= highway Arhea Olympia–Trípoli), 850 m alt., UTM EG 87, 37.6815°N 22.0147°E, leg. Pintér, E. & P. Subai 02.08.1976, S 3777/1; 3 km from Kalonério direction Arhea Olympia (= highway Arhea Olympia–Trípoli), 1090 m alt., UTM EG 97, 37.6727°N 22.0534°E, leg. Pintér, E. & P. Subai 02.08.1976, S 3776/2; lime mountain N side, 6 km from Trópea direction Dáfni, approx. 500 m alt., UTM EG 87, 37.7573°N 21.9626°E, leg. Riedel & Subai 17.04.1988, S 15759/1; 2 km from Paradísia direction Megalópoli (= highway Megalópoli–Kalamáta), 475 m alt., UTM EG 93, 37.3319°N 22.0743°E, leg. Pintér, E. & P. Subai 03.08.1976, S 3779/1; 400 from the crossing Dimitsána–Andrítsena–Megalópoli direction Dimitsána, on limestone rocks along border of road, 355 m alt., UTM EG 94, 37.4810°N 22.0492°E, leg. Subai 05.04.1986, S 15784/1; 12.5 km S from Dimitsána (= crossing Dimitsána–Trípoli–Megalópoli), on limestone rocks along border of road, 1130 m alt., UTM EG 95, 37.5453°N 22.0894°E, leg. Subai 05.04.1986, S 15786/1 (juv.); S border of Magoúliana, UTM EG 97, 37.67°N 22.12°E, leg. Pintér & Varga 21.7.1992, HNHM 44846/1; on rocks below Moni Ambeláki (= Taigetos Mountains NE border), 650 m alt., UTM FG 02, 37.2692°N 22.2181°E, leg. Hadjicharalambous & Subai 08.05.1991, S 15773/2; 5 km from Vitína direction Arhea Olympia (= highway Arhea Olympia–Trípoli), 985 m alt., UTM FG 06, 37.6515°N 22.1685°E, leg. Pintér, E. & P. Subai 02.08.1976, S 3778/1; leg. Subai 5.4.1986, S 15800/1; leg. Hadjicharalambous & Subai 8.5.1991, S 15775/1; 3.7 km from Perthóri direction Moni Epáno Hrépas, on limestone rocks, 1000 m alt., UTM FG 15, 37.5417°N 22.3347°E, leg. Hadjicharalambous & Subai 08.05.1991, S 15774/3; Levídi, UTM FG 17, 37.68°N 22.29°E, SMF 207810/3; 4.7 km from Levídi direction Kandíla, on limestone rocks, 720 m alt., UTM FG 17, 37.7214°N 22.3276°E, leg. Hadjicharalambous & Subai 07.05.1991, S 15783/10; 4 km from Manthiréa direction Spárti, on limestone rocks,

860 m alt., UTM FG 23, 37.3813°N 22.4034°E, leg. Pintér, E. & P. Subai 05.08.1976, S 3780/1; 1.5 km SSE of Kandíla, near Kandílas monastery, 800 m alt., UTM FG 28, 37.7635°N 22.3745°E, leg. Gittenberger 17.8.2000, NNM/5; Parnon Mountains, approx. 5.5 km SSE of Ágios Pétros (= approx. 2.5 km from road junction to Kastanitsa), on limestone rocks and among rock pebbles, 970 m alt., UTM FG 32, 37.3114°N 22.5775°E, leg. Riedel & Subai 20.04.1988, S 15769/2; Ágios Ioánnis, UTM FG 43, 37.35°N 22.63°E, leg. Neuteboom 4.9.1982, NNM/1; 1 km from Ágios Ioánnis direction Ástros, on limestone rocks, 750 m alt., UTM FG 43, 37.3539°N 22.6401°E, leg. Subai 16.07.1979, S 6425/9; between Elónis monastery and Kosmās, small caves near Ágios Dimitri, UTM FG 50, 37.13°N 22.76°E, leg. Neuteboom 30.8.1982, NNM/2 (juv.); SW border of Ágios Andreas, on limestone rocks, 90 m alt., UTM FG 53, 37.3437°N 22.7690°E, leg. Subai 16.07.1979, S 6424/9; 1 km E of Ágios Andréas, UTM FG 53, 37.34°N 22.78°E, leg. Hoenselaar 14.5.1996, Maa/1; 2 km SE of Ágios Andréas, 25 m alt., UTM FG 53, 37.33°N 22.79°E, leg. Neuteboom 30.8.1982, NNM/1 + 1 (juv.); 3 km SE of Ágios Andréas, UTM FG 53, 37.32°N 22.79°E, leg. Kiss & Pintér, 18.8.1988, HNHM 44594/2 + 1 (juv.); 5 km SE of Ágios Andréas, opposite of Camping "Arkadia", UTM FG 53, 37.33°N 22.80°E, leg. Hoenselaar 12.5.1996, Maa/1; leg. Neuteboom 30.8.1982, NNM/1 + 2 (juv.); 3 km SE of Ástros, UTM FG 53, 37.38°N 22.77°E, leg. Kiss & Pintér, 18.8.1988, HNHM 44593/39 + 7 (juv.); 7 km from Ástros direction Árgos, on limestone rocks, 75 m alt., UTM FG 54, 37.4663°N 22.7421°E, leg. Subai 16.07.1979, S 15753/14; leg. Neuteboom 4.9.1982, NNM/3 + 3 (juv.); on rocks of coastal road Kivéri-Ástros, 7.4 roadkm. N of bifurcation to Parálio Ástros, 25 m alt., UTM FG 54, 37.49°N 22.72°E, leg. Gittenberger 25.7.2000, NNM 71842/2; 1 km S von Kivéri, an Kalkfelsen, UTM FG 55, Subai 17.7.1979, S 15755/13 + 2 (juv.); leg. Kiss & Pintér 17.8.1988, HNHM 44592/1 + 3 (juv.); Pirgóúdi, UTM FG 60, leg. Kiss & Pintér, 18.8.1988, HNHM 85639/4; on rocks near Livádi (= 5 km NE of Leonídio), 25 m alt., UTM FG 61, 37.19°N 22.89°E, leg. Gittenberger 20.7.2000, NNM 71861/1; on rocks along the road, 1.7 km NE of Tsitália, UTM FG 61, 37.13°N 22.87°E, leg. Gittenberger 21.7.2000, NNM 71858/3; on conglomerate rocks at W border of Leonídio, 100 m alt., UTM FG 61, 37.1694°N 22.8529°E, leg. Subai 16.07.1979, S 6690/39; leg. Butot & Subai, 19.2.1981, S 15806/25 + 4 (juv.); 1 km W of Leonídio, UTM FG 61, 37.16°N 22.83°E, leg. Kiss & Pintér, 18.8.1988, HNHM 44595/14 + 4 (juv.); Pláka, UTM FG 61, 37.14°N 22.89°E, leg. Kiss & Pintér, 18.8.1988, HNHM 85640/1; gorge 4 km WSW of Leonídio, 285 m alt., UTM FG 61, 37.15°N 22.79°E, leg. Neuteboom 30.8.1982, NNM/6; leg. Kiss & Pintér, 18.8.1988, HNHM 44596/1; 5.5 km from Ágios Andréas direction Tíros, UTM FG 62, 37.25°N 22.85°E, leg. Neuteboom 30.8.1982, NNM/1; 5 km from Ágios Andreas direction Tíros, on limestone rocks, 25 m alt., UTM FG 63, 37.3242°N 22.8161°E, leg. Subai 16.07.1979, S 6426/57. — Argolída, mountain pass 7 km from Kandíla direction Psári, Olígirtos Mountains, on limestone rocks, 1400–1450 m alt., UTM FG 28, 37.7944°N 22.3979°E, leg. Hadjicharalambous & Subai 07.05.1991, S 15782/9; 3 km NW of Ahladókambos, UTM FG 35, 37.54°N 22.53°E, leg. Kiss & Pintér 20.7.1986, HNHM 29907/2 (juv.); 8 km from Ahladókambos direction Trípoli, on limestone rocks, 720 m alt., UTM FG 35, 37.5356°N 22.5136°E, leg. Pintér, E. & P. Subai 05.08.1976, S 3772/1; mountain slope 12.5 km from Agiorgítika direction Árgos (= environment of Ahladókambos), on limestone rocks, 800 m alt., UTM FG 35, 37.5385°N 22.5741°E, leg. Subai 05.04.1986, S 15787/7; on rocks 1.3 roadkm. E of Andrítsa, 120 m alt., UTM FG 44, 37.47°N

22.62°E, leg. Gittenberger 24.7.2000, NNM 71848/2; Trípoli–Nafplio Landstrasse, highway Trípoli–Nafplio, 4 km from the bifurcation to Spiliotákis direction Trípoli, on limestone rocks, 600 m alt., UTM FG 45, 37.5232°N 22.6404°E, leg. Pintér, E. & P. Subai 05.08.1976, HNHM 39176/4, S 3774/5; mountain slope 7 km from Ahladókambos direction Árgos, on limestone rocks, 650 m alt., UTM FG 45, 37.5181°N 22.6173°E, leg. Subai 05.04.1986, S 15788/3; leg. Riedel & Subai 20.4.1988, S 15768/1; in Kefalari, on limestone rocks and from a rich spring, 30–35 m alt., UTM FG 46, 37.5959°N 22.6882°E, leg. Subai, 18.07.1979, S 15743/7; on rocks 12 roadkm. E of Andrítsa (= 3 km W of Kivéri), 55 m alt., UTM FG 55, 37.50°N 22.68°E, leg. Gittenberger 24.7.2000, NNM 71853/1; Nafplio (= Nauplia, Nauplion), UTM FG 55, 37.56°N 22.81°E, SMF 101867/6, 101880/1, 207813/2, 284883/6, 284898/3, 284899/3, 284904/2; leg. Subai, 18.7.1979, S 15742/19; leg. Sin 6–7.7.1985, HNHM 24037/11 + 2 (juv.), 24042/6; leg. Kiss & Pintér, 19.7.1986, HNHM 29891/122 + 46 (juv.); on ruins of the old castle of Tiryns, 15 m alt., UTM FG 56, 37.5990°N 22.8001°E, leg. Pintér, E. & P. Subai 06.08.1976, HNHM 39180/12 + 1 (juv.), S 3769/20; leg. Neuteboom 30.8.1982, NNM/5; leg. Mészáros 1.5.1986, HNHM 44342/2; leg. Kiss & Pintér, 19.7.1986, HNHM 29913/8 + 4 (juv.); Árgos, on ruins of the old castle, 260 m alt., UTM FG 56, 37.6384°N 22.7150°E, leg. Pintér, E. & P. Subai 05.08.1976, S 3773/15; Subai, 18.7.1979, S 6699/97 + 1 (alk.); Mykenai, UTM FG 57, 37.72°N 22.75°E, SMF 284961/8, 285171/6; leg. Pfeiffer, 1926, SMF 101847/4; leg. Eröss 21.7.1992, S, 18260/1; ruins of the old castle of Mykene and in valley beside it, 220 m alt., UTM FG 57, 37.7291°N 22.7577°E, leg. Pintér, E. & P. Subai 06.08.1976, HNHM 39168/5, S 3770/5; leg. Nosek 29.9.1976, HNHM 23962/1; leg. Sín 8.7.1985, HNHM 24046/5 + 1 (juv.); leg. Kiss & Pintér 20.7.1986, HNHM 29912/16 + 4 (juv.); leg. Subai 20.4.1988, S 15767/24; Toló, UTM FG 65, 37.52°N 22.85°E, leg. Kiss & Pintér 17.8.1988, HNHM 44591/58 + 13 (juv.); Toló, Camping "Kastráki", UTM FG 65, 37.52°N 22.85°E, 37.52°N 22.85°E, leg. Hoenselaar 15.5.1996, Maa/9; surroundings of Drépano, UTM FG 65, 37.53°N 22.89°E, leg. Mészáros 30.4.1986, HNHM 44340/41 + 30 (juv.); ancient Asine (= near Asíni, SE of Nafplio), UTM FG 65, 37.52°N 22.87°E, leg. Hoenselaar 15.5.1996, Maa/2; from road Pirgiótika–Arkadiko towards Ágios Dimítrios, UTM FG 66, 37.58°N 22.93°E, leg. Neuteboom 4.9.1982, NNM/3; mountain slope 2 km from Agionóri direction Límnes, on limestone rocks, 700 m alt., UTM FG 67, 37.7439°N 22.8739°E, leg. Subai 04.04.1986, S 15792/22; mountain slope 3 km from Agionóri direction Límnes, on limestone rocks, 730 m alt., UTM FG 67, 37.7388°N 22.8772°E, leg. Subai 04.04.1986, S 15793/1 + 1 (juv.); Néa Epídavros, bifurcation to Ligoúrio, UTM FG 87, 37.68°N 23.09°E, leg. Neuteboom 4.9.1982, NNM/8; 1 km N of Néa Epídavros, UTM FG 87, 37.68°N 23.13°E, leg. Kiss & Pintér 16.8.1988, HNHM 85642/19; 1 km N of Ermióni, UTM FG 94, 37.39°N 23.24°E, leg. Kiss & Pintér 17.8.1988, HNHM 44590/3 + 2 (juv.); steps of the amphitheatre in Epidauros, UTM FG 86, 37.6334°N 23.1599°E, leg. Pintér, E. & P. Subai 06.08.1976, HNHM 39173/4, S 3771/6; 1 km N of Trahiá, UTM FG 96, 37.58°N 23.15°E, leg. Kiss & Pintér 16.8.1988, HNHM 85638/12; 1 km W von Eleónas, UTM n. det., leg. Kiss & Pintér 24.7.1986, HNHM 29898/12 + 3 (juv.); Ília bei Kastrí, UTM n. det., leg. Philippson 8.9.1887, SMF 284896/7 + 1 (juv.). — Messenía, ruins of the old Navarino palace (= Paleókástro, S of Petrohóri), under stones, on limestone rocks, 120 m alt., UTM EF 58, 36.9582°N 21.6568°E, leg. Riedel & Subai, 18.04.1988, S 15764/6; on walls of the old castle in Pílos, 30 m alt., UTM EF 68, 36.9118°N 21.6909°E, leg. Subai

06.04.1986, S 15790/8; E border of Pílos, on limestone rocks, 50 m alt., UTM EF 68, 36.9204°N 21.7052°E, leg. Subai 11.07.1979, S 15748/3; 6 km from Pílos direction Kalamáta, on limestone rocks, 70 m alt., UTM EF 68, 36.9373°N 21.7429°E, leg. Subai 06.04.1986, S15791/2; Camping "Navarino Beach" NE of Pílos, UTM EF 68, 36.93°N 21.71°E, leg. Hoenselaar 26.4.1996, Maa/2; cave niches 8 km from Methóni direction Pílos, on limestone rocks, UTM EF 68, 36.8877°N 21.7044°E, leg. Subai 11.07.1979, S 15749/6; 8 km from Handrinós direction Pílos (= highway Pílos–Messíni), on limestone rocks, 50 m alt., UTM EF 68, 36.9373°N 21.7423°E, leg. Subai 12.07.1979, S 6572/3 + 5 (alk.); Néstor's Palace between Hóra and Korifási, tomb of Néstor, UTM EF 69, 37.04°N 21.70°E, leg. Hoenselaar 27.4.1996, Maa/2; mountain SW of Hrisokellariá, on limestone rocks, 400 m alt., UTM EF 77, 36.7864°N 21.8801°E, leg. Hadjicharalambous & Subai 11.05.1991, S 15777/10; Kastánia near Petalidi, UTM EF 89, 36.95°N 21.88°E, leg. Philippson 26.10.1887, SMF 284917/1, 284918/3; Kalamáta, UTM EF 99, EG 90, 37.02°N 22.11°E, leg. Philippson 14.10.1887, SMF 284895/1; cave niches 1 km from Gargaliáni direction Kiparissía, on limestone rocks, 200 m alt., UTM EG 50, 37.0667°N 21.6199°E, leg. Subai 10.07.1979, S 6666/8; Filiatrá, UTM EG 51, 37.15°N 21.58°E, leg. Thiesse, 1890, SMF 284903/17; 2.9 km from Filiatrá direction Pláti, on limestone rocks, 140 m alt., UTM EG 51, 37.1657°N 21.6212°E, leg. Hadjicharalambous & Subai 12.05.1991, S 15757/11; in Touloupa Hani Village (= E of Hóra and Metamórfosi), on limestone rocks, 470 m alt., UTM EG 60, 37.0621°N 21.7804°E, leg. Riedel & Subai, 18.04.1988, S 15763/5; E border of Rodiá (= SE of Kiparissía), on limestone rocks and along river bank, 420 m alt., UTM EG 61, 37.2106°N 21.7336°E, leg. Riedel & Subai, 18.04.1988, S 15765/2; 1.2 km E of Rodiá, on low limestone rocks, 390 m alt., UTM EG 61, 37.2129°N 21.7400°E, leg. Hadjicharalambous & Subai 12.05.1991, S 15758/8; ruins of the old castle in Kiparissía, 100 m alt., UTM EG 62, 37.2506°N 21.6783°E, leg. Subai 10.07.1979, S 6411/42; on dry limestone rocks 13 km N of Kiparissía (= highway Pírgos–Pílos), 50 m alt., UTM EG 63, 37.3473°N 21.7015°E, leg. Subai 10.07.1979, S 15881/8; Ithómi (= antic Messene), on ruins of the town walls, 350 m alt., UTM EG 81, 37.1784°N 21.9184°E, leg. Pfeiffer, 1926, SMF 101850/7; leg. Pintér & Subai 4.8.1976, HNHM 39190/4, S 3788/1; leg. Subai 12.07.1979, S 6410/1; leg. Kiss & Pintér 22.7.1986, HNHM 29908/5 + 2 (juv.); leg. Hoenselaar 24.4.1996, Maa/2; 2 km W of the crossing near Lámbena (= N of Messíni), 230 m alt., UTM EG 81, 37.1485°N 21.9418°E, leg. Pintér, E. & P. Subai 04.08.1976, S 3787/10; mountain slope 6.6 km from Lámbena direction Mavrongáti, on limestone rocks, 280 m alt., UTM EG 81, 37.1517°N 21.9299°E, leg. Subai 05.04.1986, S 15785/2; 5.5 km from Ithómi direction Lámbena, on limestone rocks along border of road, 275 m alt., UTM EG 81, 37.1511°N 21.9299°E, leg. Subai 12.07.1979, S 15754/3; 3 km N of Bassai, UTM EG 84, 37.45°N 21.92°E, leg. Kiss & Pintér 20.8.1988, HNHM 44599/2 + 1 (juv Málta village (= SE of Kalamáta), on medieval castle ruins, 370 m alt., UTM FF 08, 36.9313°N 22.1915°E, leg. Pintér, E. & P. Subai 04.08.1976, HNHM 39178/9, S 3789/7; 4 km of Kalamáta, near Camping "Maria's See and Sun", UTM FF 09, 37.02°N 22.02°E, leg. Hoenselaar 28.4.1996, Maa/4; above Mikra Mandínia (= Taigetos Mountains SE of Kalamáta), 120 m alt., UTM FF 09, 36.9845°N 22.1619°E, leg. Pintér, E. & P. Subai 04.08.1976, HNHM 39181/4, S 3790/5; N of Kámbos (= Taigetos Mountains SE of Kalamáta), on limestone rocks, 210 m alt., UTM FF 09, 36.9556°N 22.1913°E, leg. Pintér, E. & P. Subai 04.08.1976, HNHM 39183/1; limestone rocks in valley near Langá-

da, 430 m alt., UTM FF 17, 36.7801°N 22.3383°E, leg. Butot & Subai 16.02.1981, S 17531/13; leg. Neuteboom 31.8.1982, NNM/4; Roman stone highway near Plátsa, on limestone rocks, 370 m alt., UTM FF 17, 36.8074°N 22.3205°E, leg. Butot & Subai 16.02.1981, S 17532/11; border of Plátsa direction Nomítsis, UTM FF 17, 36.80°N 22.31°E, leg. Neuteboom 31.8.1982, NNM/1; 15 km from Pigí direction Kalamáta, on limestone rocks, 25 m alt., UTM FF, 18, 36.8592°N 22.2564°E, leg. Subai 13.07.1979, S 6427/3; S border of Kardamili, on limestone rocks, UTM FF, 18, 36.8849°N 22.2356°E, leg. Butot & Subai 16.02.1981, S 17530/1; leg. Neuteboom 31.8.1982, NNM/5; in valley W of Kéndro, on limestone rocks and from a spring at river bank, 575 m alt., UTM FF, 18, 36.9504°N 22.2502°E, leg. Subai 06.04.1986, S 15789/1; gorge 3.8 km E of Kéndro (= Chóra Gaitses), approx. 720 m alt., UTM FF, 19, 36.9749°N 22.2596°E, leg. Hadjicharalambous & Subai 10.05.1991, S 15770/4; highway Kalamáta–Spárti, start of Artemíssia gorge (= Taigetos Mountains NE of Kalamáta), 710 m alt., UTM FG 00, 37.0298°N 22.1865°E, leg. Pintér, E. & P. Subai 05.08.1976, HNHM 39185/15 + 2 (juv.), S 3786/16; Artemissía gorge 9.4 km from Kalamáta direction Artemissía, on limestone rocks, 310 m alt., UTM FG 00, 37.0840°N 22.1575°E, leg. Hadjicharalambous & Subai 11.05.1991, S 15776/41 + 4 (juv.); Dimiówis monastery (= Taigetos Mountains NE of Kalamáta), on limestone rocks, 820 m alt., UTM FG 00, 37.0412°N 22.2001°E, leg. Pintér, E. & P. Subai 03.08.1976, HNHM 39189/4; on limestone rocks at border of Eleohóri Village (= Janitsa), 545 m alt., UTM FG 00, 37.0408°N 22.1817°E, leg. Hadjicharalambous & Subai 10.05.1991, S 15771/10; Taigetos Mountains, at the governmental border of Messinía to Lakonía, on marble rocks, 880 m alt., UTM FG 10, 37.0745°N 22.2955°E, leg. Pintér, E. & P. Subai 05.08.1976, HNHM 39169/2; leg. Neuteboom 31.8.1982, NNM/1; Kalamáta–Areópoli highway, chapel St. Nicholas Kabinari, UTM n. det., leg. Hoenselaar 28.4.1996, Maa/1. — Lakonía, on limestone rocks at W border of Geroliménas, 25 m alt., UTM FF 23, 36.4842°N 22.3993°E, leg. Butot & Subai 14.02.1981, S 17527/8 + 5 (juv.); leg. Kiss & Pintér 21.7.1986, HNHM 29904/1 + 1 (juv.); Geroliménas, road to Areópoli, UTM FF 23, 36.48°N 22.39°E, leg. Neuteboom 2.9.1982, NNM/2 + 1 (juv.); Geroliménas, road to Kouínos, UTM FF 23, 36.49°N 22.39°E, leg. Neuteboom 2.9.1982, NNM/1 + 1 (juv.); W of Pírrihos (= between Kótronas and Areópoli), UTM FF 25, 36.65°N 22.43°E, leg. Neuteboom 2.9.1982, NNM/2 (juv.); Pírgos (= S of Areópoli), on limestone rocks beside the "Diros" cave, 5–10 m alt., UTM FF 25, 36.6382°N 22.3792°E, leg. Subai 13.07.1979, S 15812/18; leg. Butot & Subai 14.2.1981, S 15807/71 + 4 (juv.) + 1 (alk.); leg. Kiss & Pintér 21.7.1986, HNHM 29916/6 + 3 (juv.); 2 km W of Vahós, UTM FF 26, 36.68°N 22.40°E, leg. Kiss & Pintér 21.7.1986, HNHM 29899/3; on limestone rocks near Liméni (= N of Areópoli), 40 m alt., UTM FF 26, 36.6787°N 22.3778°E, leg. Butot & Subai 16.02.1981, S 17529/21; S border of Néo Ítilo, on limestone rocks, 30 m alt., UTM FF 26, 36.6877°N 22.3862°E, leg. Hadjicharalambous & Subai 10.05.1991, S 15772/2; mountain slope 11 km from Petrina direction Árna, on low limestone rocks, 760 m alt., UTM FF 28, 36.8785°N 22.4254°E, leg. Butot & Subai 15.02.1981, S 17528/3; between Ágios Dimítrios and Kokála, UTM FF 33, 36.51°N 22.47°E, leg. Neuteboom 2.9.1982, NNM/3 + 2 (juv.); mountain slope at border of Githio direction Spárti, on limestone rocks, 30 m alt., UTM FF 36, 36.7594°N 22.5562°E, leg. Butot & Subai, 18.02.1981, S 17537/2; 8.5 km from Githio direction Areópoli, in forest S of the highway, on limestone rocks, 150 m alt., UTM FF 36, 36.7398°N 22.4936°E, leg. Hadjicharalambous & Subai 10.05.1991, S

15880/3; gorge 10 km from harbor of Githio direction Areópolis, on limestone rocks, 40 m alt., UTM FF 36, 36.7299°N 22.5055°E, leg. Butot & Subai, 18.02.1981, S 17536/7 + 3 (juv.); gorge 15 km from port of Githio direction Areópolis, on limestone rocks, 100 m alt., UTM FF 36, 36.7023°N 22.4725°E, leg. Butot & Subai leg.14.02.1981, S 17526/4; gorge 12 km from Githio direction Areópolis, on limestone rocks and from a spring, 30 m alt., UTM FF 36, 36.7178°N 22.4998°E, leg. Subai 13.07.1979, S 15752/1; approx. 14 km from Githio direction Areópolis, on limestone rocks beside the highway, 100 m alt., UTM FF 36, 36.7017°N 22.4713°E, leg. Hadjicharalambous & Subai 10.05.1991, S 15810/1 + 1 (juv.); 1 km S of Goritsá, UTM FF 39, 37.01°N 22.56°E, leg. Kiss & Pintér, 19.8.1988, HNHM 44597/36 + 7 (juv.); Spárti–Geráki country road, 1 km E of Kefalás, UTM FF 39, 37.02°N 22.53°E, leg. Hoenselaar 4.5.1996, Maa/1; Stefaniá, UTM FF 47, 36.84°N 22.60°E, leg. Kiss & Pintér 20.7.1986, HNHM 29914/2 + 2 (juv.); 6.5 km from Skála direction Githio, on limestone rocks beside a bridge and from the creek, UTM FF 47, 36.8048°N 22.6179°E, leg. Subai 14.07.1979, S 6578/4; 13 km from Skála direction Githio, on limestone rocks, 50 m alt., UTM FF 47, 36.7959°N 22.5957°E, leg. Subai 14.07.1979, S 6660/2; 3 km from Skála direction Spárti, on limestone rocks beside highway, 100 m alt., UTM FF 47, 36.8594°N 22.6058°E, leg. Subai 14.07.1979, S 15747/76; 4 km SE of Agii Anárgiri, UTM FF 49, 37.00°N 22.66°E, leg. Kiss & Pintér, 19.8.1988, HNHM 44598/1; Ortsrand von Geráki in Richtung Spárti, unter Steinen, UTM FF 59, leg. Butot & Subai, 18.02.1981, S 17538/1; 5 km from the crossing Geráki–Spárti, Skála–Kosmás direction Kosmás, on limestone rocks, 800 m alt., UTM FF 59, 37.0607°N 22.7071°E, leg. Butot & Subai, 18.02.1981, S 17539/3 + 2 (juv.); 4 km N from the bifurcation to Mólai, on limestone rocks 500 m E of the highway, 250 m alt., UTM FF 67, 36.8456°N 22.8448°E, leg. Subai 14.07.1979, S 15745/12; 4 km N of Mólai, UTM FF 67, 36.84°N 22.83°E, leg. Neuteboom 1.9.1982, NNM/4 + 1 (juv.); Apídia, road direction Spárti–Monemvassía, UTM FF 68, 36.88°N 22.79°E, leg. Neuteboom 1.9.1982, NNM/2 (juv.); rock gorge 10.5 km from the bifurcation to Mólai direction Skála, 250 m alt., UTM FF 68, 36.8635°N 22.8154°E, leg. Subai 14.07.1979, S 6802/1; highway Skála–Mólai, on limestone rocks near bifurcation to Niáta, 230 m alt., UTM FF 68, 36.8683°N 22.8145°E, leg. Butot & Subai 17.02.1981, S 17534/11 + 2 (juv.); 700 m N of Nómia (= road direction Kardenitsa), UTM FF 75, 36.65°N 23.01°E, leg. Neuteboom 2.9.1982, NNM/1 + 2 (juv.); Elika, before junction to Arhángelos, UTM FF 75, 36.62°N 22.89°E, leg. Neuteboom 1.9.1982, NNM/5 + 2 (juv.); 9 km from Lira direction Nómia, on limestone rocks, 85 m alt., UTM FF 75, 36.6521°N 23.0139°E, leg. Butot & Subai 17.02.1981, S 17533/7 + 1 (juv.); 9 km from Monemvassía direction Skála, on limestone rocks along border of road, 100 m alt., UTM FF 76, 36.7301°N 22.9882°E, leg. Subai 14.07.1979, S 15746/8; Sikía–Monemvassía highway after junction to Veliés, UTM FF 76, 36.72°N 22.97°E, leg. Neuteboom 1.9.1982, NNM/3 + 3 (juv.); Veliés–Angelóna road, 3 km before Sikía, UTM FF 76, 36.74°N 22.95°E, leg. Neuteboom 1.9.1982, NNM/4 + 1 (juv.); Talanda, before junction to Ágios Nikólaos, UTM FF 76, 36.67°N 22.94°E, leg. Neuteboom 1.9.1982, NNM/3; Ágios Apóstoli (= 16 km SE of Pandanassa), 36.55°N 23.02°E, UTM FF 84, leg. Neuteboom 1.9.1982, NNM/7 + 3 (juv.); mountain near Dermatiánika (= Kabos, N of Neapolis), on limestone rocks and on house ruins, 70 m alt., UTM FF 84, 36.5451°N 23.0533°E, leg. Butot & Subai 17.02.1981, S 15805/53 + 4 (juv.) + 12 (alk.); 1 km N of Monemvassía, UTM FF 86, 36.68°N 23.03°E, leg. Kiss & Pintér 21.7.1986, HNHM 29906/4; in the old town of Mon-

emvassía, on wall remains and under stones, 50 m alt., UTM FF 86, 36.6888°N 23.0572°E, leg. Subai 14.07.1979, S 6579/11; leg. Butot & Subai 17.2.1981, S 17525/6 + 1 (juv.) + 3 (alk.); leg. Neuteboom 1.9.1982, NNM/10 + 3 (juv.); leg. Kiss & Pintér 20.7.1986, HNHM 29893/50 + 4 (juv.); 2 km from Monemvassía direction Nómia, on rocks at the sea shore beside the highway, UTM FF 86, 36.6710°N 23.0306°E, leg. Butot & Subai 17.02.1981, S 17535/6 + 1 (alk.); leg. Kiss & Pintér 21.7.1986, HNHM 29892/28 + 14 (juv.); well of Trípi Village, UTM FG 10, 37.09°N 22.35°E, leg. Neuteboom 31.8.1982, NNM/1 (juv.); Mistra, byzantine ruin town W of Spárti, 410 m alt., UTM FG 20, 37.0739°N 22.3691°E, leg. Pintér, E. & P. Subai 05.08.1976, HNHM 39167/6, S 3797/7; leg. Neuteboom 3.9.1982, NNM/1 (juv.); leg. Kiss & Pintér 22.7.1986, HNHM 29910/1 + 1 (fragment); Spárti, UTM FG 20, 37.07°N 22.43°E, leg. Pfeiffer, 1926, SMF 101849/1; 4 km from Spárti direction Hrísa, UTM FG 20, 37.12°N 22.49°E, leg. Neuteboom 3.9.1982, NNM/2; 2 km S of Kástro, UTM n. det., leg. Kiss & Pintér 9.7.1986, HNHM 29902/3. — Adelfí Island, NW part of the Island, 20 m alt., UTM GJ 53, 39.11°N 23.97°E, leg. Uit de Weerd 5.6.1999, NNM/2. — Adelfópoulo Island, S part of central area, 20 m alt., 39.12°N 23.98°E, UTM GJ 53, leg. Uit de Weerd 5.6.1999, NNM/5. — Alónissos Island, Patitíri–Miléa road, 1.2–1.6 km NE of harbour Patitíri (= approx. 2.5–2.8 km NE of Alónissos town), 210 m alt., 39.15°N 23.87°E, UTM GJ 43, leg. Uit de Weerd 4.6.1999, NNM/1 + 3; 150 m from road Patitíri–Miléa towards Leftogiálo (= 4.5 km NE of Alónissos town), 160 m alt., UTM GJ 44, 39.16°N 23.88°E, leg. Uit de Weerd 4.6.1999, NNM/2; Ormos Tsortsi (= 4.2 km NE of Alónissos town), 4 m alt., UTM GJ 53, 39.16°N 23.88°E, leg. Uit de Weerd 6.6.1999, NNM/2; Patitíri–Gerakis road, 2.1 km NE from turning point to Leftos Giakos (= 6.5 km NE of Alónissos town), UTM GJ 54, 39.17°N 23.90°E, leg. Uit de Weerd 6.6.1999, NNM/1. — Gioúra Island, UTM KD 56, 39.39°N 24.16°E, leg. Storch 7.7.1978, SMF 284930/1; Gioúra Island, E coast, UTM KD 56, 39.38°N 24.18°E, leg. Storch 6.7.1978, SMF 284929/1. — Kirá Panagiá Island, UTM KD 45, 39.32°N 24.07°E, leg. Storch 1.7.1978, SMF 284928/3. — Pipéri Island, UTM KD 65, 39.35°N 24.32°E, leg. Storch 4.7.1978, SMF 284927/1. — Skándzoura Island, UTM KD 52, 39.08°N 24.11°E, leg. Storch 9.7.1978, SMF 284925/9; Skándzoura monastery, UTM KD 52, 39.08°N 24.11°E, leg. Storch 10.7.1978, SMF 284926/3. — Skíathos Island, UTM n. det., SMF 284945/2; Skíathos town, "Odos Filokleus Georgiadou" 200 m NE of harbour, 20 m alt., UTM GJ 13, 39.16°N 23.49°E, leg. Gittenberger & Uit de Weerd 29.5.1999, NNM/3; Evangelistrías monastery (= 4 km NNW of Skíathos town), 80 m alt., UTM GJ 14, 39.1904°N 23.4806°E, leg. Gittenberger & Uit de Weerd 30.5.1999, NNM/2 + 1 (juv.); 400 m N of Evangelistrías monastery, 150 m alt., UTM GJ 14, 39.19°N 23.48°E, leg. Gittenberger & Uit de Weerd 30.5.1999, NNM/4; 1 km N of Evangelistrías monastery, 230 m alt., 39.19°N 23.48°E, UTM GJ 14, leg. Gittenberger & Uit de Weerd 29.5.1999, NNM/4. — Skópelos Island, UTM n. det., leg. Banzhaf, 1929, SMF 284876/1 (juv.); Kafasi, 1 km ESE of Metamórfosis monastery (= 3 km ESE of Skópelos town), 200 m N of junction, 300 m alt., UTM GJ 33, 39.11°N 23.75°E, leg. Uit de Weerd 3.6.1999, NNM/1 (juv.); Koprísies Mountain, 400–1300 m from peak (along the road), 320–370 m alt., UTM GJ 33, GPS n. det., leg. Uit de Weerd 1.6.1999, NNM/1 + 2 + 24; 500 m NNE of church Ágios Konstantínos (= 1.2 km NW of Skópelos town), S slope, UTM GJ 33, 39.13°N 23.71°E, leg. Uit de Weerd 2.6.1999, NNM/1. — Évvia Island (= Euböa), N border of Ágios Geórgios, in valley, on dry limestone rocks, 50 m alt., UTM FJ 60, 38.8410°N 22.8920°E, leg. Subai & Szekeres 10.05.1997, S 15687/2; spruce for-

est 5 km from Gregolimano direction Ágios Geórgios, approx. 200 m N of the highway, on dry limestone rocks, 50 m alt., UTM FJ 60, 38.8401°N 22.9054°E, leg. Subai & Szekeres 10.05.1997, S 15699/14 + 3 (juv.) + 1 (alk.); Loutrá Edipsoú, near church, UTM FJ 70, 38.85°N 23.04°E, leg. Neuteboom 25.10.1984, NNM/1 (juv.); Límni, UTM GH 09, 38.76°N 23.32°E, leg. Krüper, 1903, SMF 101970/3; Mantoúdi, UTM GH, 19, 38.79°N 23.48°E, leg. Ottermann, 1912, SMF 284860/22; S border of Mantoúdi, on limestone rocks at river side, 20 m alt., UTM GH, 19, 38.7942°N 23.4770°E, leg. Subai 01.05.1991, S 15708/2; leg. Gittenberger & Uit de Weerd 10.6.1999, NNM/2; Halkída (= Chalcis), UTM GH 26, 38.46°N 23.58°E, SMF 284943/3, 284944/4, 285166/2; leg. Fitz-Gerard, 1881, SMF 101986/3; Kiparíssi (= 7 km N of Psahná), UTM GH 27, 38.62°N 23.59°E, leg. Neuteboom 23.10.1984, NNM/1 + 4 (juv.); 1.5 km S of Néa Pagóntas, UTM GH 28, 38.65°N 23.56°E, leg. Neuteboom 24.10.1984, NNM/1; approx. 1–2 km N of Néa Artáki, approx. 200 m E of the highway, on low limestone rocks, UTM GH 26, 38.5404°N 23.6344°E, leg. Riedel & Subai 09.04.1988, S 15803/4 + 2 (alk.); Dírfis Mountains (= Monte Delphi), UTM GH 47, 38.62°N 23.84°E, SMF 101879/1, 284921/5, 284922/4, 284923/3, 285764/8; Stení, UTM GH 47, 38.58°N 23.83°E, SMF 101856/4, 101871/15, 284924/3; above Áno Stení, on limestone rocks, 520 m alt., 520 m alt., UTM GH 47, 38.5847°N 23.8349°E, leg. Subai & Szekeres 10.05.1997, S 15917/1 + 3 (juv.); Dírfi Mountains, N of the highway Steni Dirfios–Strópones, 200 m NE of the E.O.S. refuge hut, on limestone rocks, 1150 m alt., UTM GH 47, 38.6142°N 23.8597°E, leg. Subai & Szekeres 10.05.1997, S 15918/1; 9 km from Stení Dírfios towards Strópones, UTM GH 47, 38.60°N 23.87°E, leg. Neuteboom 23.10.1984, NNM/2 + 3 (juv.); 3 km from Strópones towards Stení Dírfios, UTM GH 57, 38.60°N 23.88°E, leg. Neuteboom 23.10.1984, NNM/1 (juv.); small rock gorge at W border of Strópones (= Dírfis Mountains), on limestone rocks, 360 m alt., UTM GH 57, 38.6205°N 23.8853°E, leg. Subai 01.05.1991, S 15709/6; S of Vassiliká, UTM GJ 01, 38.96°N 23.35°E, leg. Neuteboom 24.10.1984, NNM/2 + 1 (juv.); 1.7 km from Elliniká direction Vassiliká, on limestone rocks beside the quarry, 35 m alt., UTM GJ 01, 38.9979°N 23.3488°E, leg. Subai 30.04.1991, S 15707/2; on rocks E of Elliniká, UTM GJ 02, 39.00°N 23.34°E, leg. Neuteboom 24.10.1984, NNM/1; W border of Alivéri, on limestone rocks and in rock debris, 350 m alt., UTM KC 45, 38.4022°N 24.0138°E, leg. Subai 16.04.1986, S 15883/35 + 1 (alk.); leg. Neuteboom 22.10.1984, NNM/1; S of Kriezá, UTM KC 45, 38.38°N 24.14°E, leg. Neuteboom 21.10.1984, NNM/1; SE border of Koutoumoulas, under stones, 125 m alt., UTM KC 45, 38.3787°N 24.1105°E, leg. Subai 16.04.1986, S 15802/2; cave niches W of Vrissi, foot of Mavrovouíni Mountains, on limestone rocks, 450 m alt., UTM KC 46, 38.5549°N 24.0268°E, leg. Subai 16.04.1986, S 15779/2; road between Orológi and Monódrio, UTM KC 46, 38.53°N 24.08°E, N leg. Neuteboom 22.10.1984, NNM/2; 1 km S of Kaliáni, UTM n. det., leg. Neuteboom 22.10.1984, NNM/2; Konistraes, UTM KC 47, 38.54°N 24.06°E, SMF 101899/4, 284957/4, 284958/2, 284959/2; Kími, UTM KC 48, 38.63°N 24.10°E, SMF 101873/2; 8.1910, SMF 285164/4, 285165/40; leg. Holtz 4.1926, SMF 207818/7; between Néa Stíra and Stíra, UTM KC 52, 38.16°N 24.22°E, leg. Pintér 22.8.1976, HNHM 39166/14 + 3 (juv.); Kapsála (= 3 km of Stíra), UTM KC 52, 38.14°N 24.24°E, leg. Neuteboom 21.10.1984, NNM/5; "Malithianon", "Malithianu", "Malithiedin", UTM n. det., leg. Krüper, SMF 101855/13, 284152/9, 285162/2; leg. Krüper, 1890, SMF 284940/4, 284949/7; Fleava, UTM n. det., leg. Krüper 7.1928, SMF 101962/5; "Achmet Aga", UTM n. det., leg. Godet, SMF 284942/4; between Lépoura

and Ag. Nikolaou monastery, UTM n. det., leg. Krüper, SMF 101868/20. — Kea Island (= Keos), approx. 1 km E of Otziás, on limestone rocks on top of a slate mountain, 180–200 m alt., UTM KB 67, 37.6774°N 24.3625°E, leg. Subai 06.05.1991, S 15700/34. — Páros Island, UTM n. det., leg. Krüper, 1883, SMF 101864/4. — Lipsí Island (= Lipsos, S of Sámos), surrounding Lipsí [Village], UTM MB 72, 37.29°N 26.77°E, leg. Becker & Wedekind 9.1984, S 15741/1. — Sámos Island, UTM n. det., SMF 101981/3; leg. Paravicini, 1933, SMF 284912/2; between Marathókambos and Ágios Theódori, UTM MB 77, 37.73°N 26.71°E, leg. Neuteboom 8.5.1978, NNM/1 (juv.); Balos (= coast above Kouméika), UTM MB 77, 37.69°N 26.74°E, leg. Neuteboom 10.5.1978, NNM/1; Ireon, Hera Temple, UTM MB 86, 37.66°N 26.87°E, leg. Neuteboom 7.5.1978, NNM/1 (juv.); 4 km from Spatharéi direction Pagóndas, UTM MB 86, 37.66°N 26.79°E, leg. Neuteboom 10.5.1978, NNM/6; leg. Maassen 5.1993, Maa/7; 2 km N of Mavratzéi, UTM MB 87, 37.73°N 26.66°E, leg. Maassen 5.1993, Maa/1; Mavratzéi, UTM MB 87, 37.71°N 26.86°E, leg. Maassen 5.1993, Maa/13; 2 km SE of Míli, UTM MB 87, 37.67°N 26.87°E, leg. Maassen 5.1993, Maa/8; 1.5 km SE of Stravrinídes, UTM MB 88, 37.78°N 26.82°E, leg. Maassen 5.1993, Maa/1; 3 km E of Avlákia (= W of Kokkári), UTM MB 88, 37.79°N 26.86°E, leg. Maassen 5.1993, Maa/2; river valley 0.5 km from Platanakia direction Manolates, UTM MB 88, GPS n. det., leg. Maassen 5.1993, Maa/9; 0.5 km W of Vourliotes, along path, UTM MB 88, 37.78°N 26.83°E, leg. Maassen 5.1993, Maa/3; wells N of Vourliotes, UTM MB 88, 37.78°N 26.84°E, leg. Maassen 5.1993, Maa/2; Sámos, UTM MB 97, 37.76°N 26.97°E, leg. Neuteboom 5.5.1978, NNM/11 (alk.); Pithagório, near Hotel "Dorissa Bay", under stones, UTM MB 97, 37.69°N 26.92°E, leg. Neuteboom 7.5.1978, NNM/9 + 1 (juv.); between Pithagório and Vathí, before pass, under stones, UTM MB 97, 37.72°N 26.96°E, leg. Neuteboom 7.5.1978, NNM/9 + 3 (juv.); Vathí (= between Sámos and Pithagório), UTM MB 97, 37.74°N 26.98°E, leg. Neuteboom 7–9.5.1978, NNM/6 + 3 (juv.); Thios Mountain, 1 km NE of Sámos, 200 m alt., UTM MB 97, 37.75°N 26.98°E, leg. Maassen 5.1993, Maa/1; Platanaki (= 1.5 km NW of Sámos), UTM MB 97, GPS n. det., leg. Maassen 5.1993, Maa/15, S 15937/3; 3 km S of Kokkári (= direction Mitilinií), 200 m alt., UTM MB 97, 37.75°N 26.90°E, leg. Maassen 5.1993, Maa/6; 1 km N of Mitilinií (= direction Kokkári), UTM MB 97, 37.74°N 26.89°E, leg. Maassen 5.1993, Maa/2; 0.5 km from Pithagório direction Spilianis, UTM MB 97, 37.69°N 26.93°E, leg. Maassen 5.1993, Maa/3; above Spilianis monastery (= N of Pithagório), under stones, UTM MB 97, 37.69°N 26.93°E, leg. Maassen 5.1993, Maa/12 + 1 (juv.) S 15938/3; 1 km W of Kokkári, UTM MB 98, 37.78°N 26.86°E, leg. Maassen 5.1993, Maa/1; 0.5 km S of Kokkári (= direction Mitilinií), 50 m alt., UTM MB 98, 37.77°N 26.89°E, leg. Maassen 5.1993, Maa/3; 1 km S of Kokkári (= direction Mitilinií), 150 m alt., UTM MB 98, 37.76°N 26.89°E, leg. Maassen 5.1993, Maa/1; Kótsikas monastery (= NE of Sámos), UTM MB 98, 37.78°N 26.96°E, leg. Maassen 5.1993, Maa/4; Ágios Paraskeví (= NE of Sámos), along beach, UTM MB 98, 37.78°N 26.99°E, leg. Maassen 5.1993, Maa/1 + 1 (juv.); 0.5 km S of Ágios Paraskeví, Thios Mountain, 150 m alt., 37.77°N 26.99°E, UTM MB 98, leg. Maassen 5.1993, Maa/3; 1 km S of Ágios Paraskeví, Thios Mountain, 300 m alt., UTM MB 98, 37.76°N 26.99°E, leg. Maassen 5.1993, Maa/2; 3 km W of Ágios Paraskeví, UTM MB 98, 37.78°N 26.95°E, leg. Maassen 5.1993, Maa/16; Thios Mountain (= NE of Sámos), Profítis Ilías peak, 430 m alt., 37.76°N 26.99°E, UTM MB 98, leg. Maassen 5.1993, Maa/3; 0.5 km N of Profítis Ilías peak, 350 m alt., 37.77°N 26.99°E, UTM MB 98, leg. Maassen 5.1993, Maa/27 + 1

(juv.) S 15939/3; W border of Kokkári, UTM MB 98, 37.78°N 26.87°E, leg. Neuteboom 8.5.1978, NNM/1; 1 km W of Agia Zóni and walls of monastery, UTM NB 07, 37.75°N 26.98°E, leg. Neuteboom 9.5.1978, NNM/13 + 37 (alk.); approx. 2–3 km E of Sámos, on rocks along sea shore, UTM NB 07, 37.76°N 27.02°E, leg. Maassen 5.1993, Maa/13; coast 1 km W of Psilí Ámmos (= E of Pithagório), UTM NB 07, 37.70°N 26.99°E, leg. Maassen 5.1993, Maa/12; 1.5 km N of Psilí Ámmos, along path, UTM NB 07, 37.72°N 27.01°E, leg. Maassen 5.1993, Maa/9. — Kálimnos Island (= Calino), UTM n. det., SMF 284915/18, 284916/2; Kálimnos town (= Pothia), UTM MA 98, 36.95°N 26.98°E, leg. Neuteboom 24.10.1979, NNM/10; gorge behind harbor of Kálimnos, UTM MA 98, 36.95°N 26.99°E, 1934, SMF 101877/6; Kástro Hrisohórias, UTM MA 98, 36.96°N 26.96°E, leg. Neuteboom 24.10.1979, NNM/6 + 1 (juv.) + 15 (alk.); behind harbor of Vathis (= Vati), UTM NA 09, 36.97°N 27.02°E, leg. K. L. Pfeiffer, 1934, SMF 101976/3. — Psérimos Island, UTM NA, 18, SMF 284914/2; leg. K. L. Pfeiffer, 1934, SMF 207817/2; leg. K. L. Pfeiffer, 1940, SMF 285175/4; leg. Neuteboom 20.10.1979, NNM/18; on rocks near harbour, UTM NA, 18, 36.93°N 27.13°E, leg. K. L. Pfeiffer, 1934, SMF 101977/30. — Kós Island, UTM n. det., SMF 207812/2. — Sphanteria Island near Tilos Island, UTM n. det., leg. Philippson 2.4.1887, SMF 284891/1.

Turkey, Çanakkale County, Gökçeada Island, UTM n. det., leg. Kleefisch 10.9.1985, (ex. coll. Schütt Nr. 1180) S 20789/1; Çanakkale, Kilidürbahir, UTM ME 44, 40.17°N 26.37°E, leg. Schütt 28.4.2002, (ex. coll. Schütt Nr. 1751) S 20790/29. — Manisa County, Cornana, UTM n. det., HNHM 39174/2; Sochia, UTM n. det., SMF 101865/4; Manisa (= ancient Magnesia), UTM NC 37, 38.60°N 27.37°E, SMF 284909/2. — Aydın County, Dilek Yarımadası Millî Parkı, Kanyon 7 km direction Güzelçamlı, UTM NB 17, 37.68°N 27.16°E, leg. Schütt 23.4.2000, (ex. coll. Schütt Nr. 1686) S 20793/15 + 2 (juv.); ruins of Milet (= Miletos), UTM NB 25, 37.52°N 27.27°E, leg. Puts, 1983, Maa/1; Samsun Mountains, Priene near Güllübahçe, above ancient ruins, UTM NB 26, 37.65°N 27.29°E, leg. Schlickum, 19.9.1968, SMF 279324/3; leg. Neuteboom 24.4.1989, NNM/1 + 1 (juv.); leg. Eröss 28.7.1992, coll. Eröss /12 + 2 (juv.); leg. Schütt 24.4.2000, (ex. coll. Schütt Nr. 1687) S 20794/22; Kuşadası, UTM NB 29, 37.85°N 27.26°E, leg. Neuteboom 6.5.1978, NNM/2 (juv.). — Izmir County, Efes (= Ephesos), among ruins, UTM NB 29, 37.93°N 27.34°E, leg. Kaysser, 1904, SMF 284902/1; leg. Schlickum 15.9.1968, SMF 279323/1; leg. Papp 10.10.1972, HNHM 33704/1; leg. Seidl 7.5.1975, HNHM 39186/2, 49552/2; leg. Neuteboom 6.5.1978, NNM/11 + 3 (juv.); leg. Eröss 30.7.1992, E&F/31; leg. Bánki 26.7.1995, HNHM 41708/3 + 3 (juv.); surroundings hous of death of Saint Maria on Ala Dag Mountain (= 5 km S of Efes), UTM NB 29, 37.91°N 27.33°E, leg. Seidl 7.5.1975, Maa/5; Pamucak, Orman Kampi, UTM NB 29, 37.93°N 27.28°E, leg. Bilgin, (ex. coll. Schütt) S 20791/1; surroundings of Izmir (= Smyrna), UTM n. det., leg. Basoglu 2.12.1956, SMF 166916/4; Izmir–Bornova, UTM NC 15, 38.47°N 27.24°E, SMF 101956/5; halfway between Izmir and Manisa, UTM NC 26, 38.54°N 27.30°E, leg. Schütt 4.9.2004, (ex. coll. Schütt Nr., 1842) S 20792/1.

Remarks: *Lindholmiola lens* is very variable in shell shape and size, a fact which caused authors to describe several varietal taxa, which here are all synonymised under *L. lens*. The nominotypical subspecies is known from the Pelopónnisos and the Ionian islands of Kefallinia and Zakynthos and is charac-

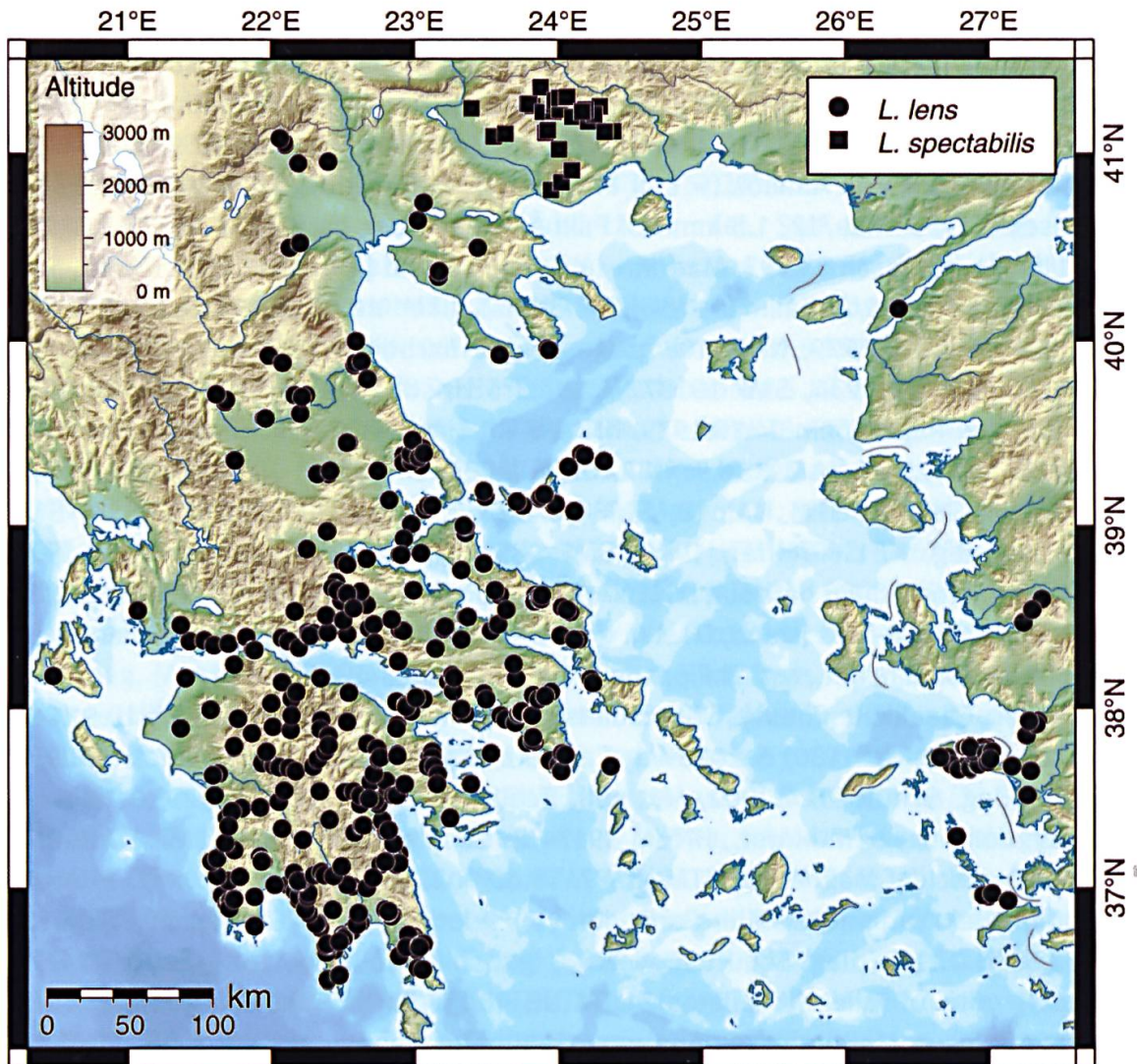


Fig. 15. Distribution of *Lindholmiola lens* and *L. spectabilis*.

terized by a blunt keel, a narrow and only slightly perspective umbilicus, the moderately enlarged peristome, the medium shell size and narrow whorls. The mountains in the north of the Pelopónnisos are inhabited by a form which differs by shells with slightly broader whorls, an even more blunt keel, and a larger perspective umbilicus (= *elia*). However, this form also lives on the Island Évvia and close to Neohóri (= NE of Aridéa) in Makedonía. This form is intermediate between the nominotypical subspecies and another, quite remarkable form (= *callojuncta*). This very distinct form has a shell with a sharp keel, broad whorls, a wide perspective umbilicus, and a surface sculpture of small riblets. Its shells are of medium size (sometimes scalarid shells occur), and the peristomial insertions are connected by a more conspicuous parietal callus. The peristome of this form is wider than in any other form of *L. lens*. The form *callojuncta* lives around the Bay of Korinthos, but also in Argolída and in Arkadía.

The eastern part of continental Greece, Atikí, the Island Évvia, Thessalía and the Halkidikí Peninsula is inhabited by a small to medium-sized form (= *lentiformis*). It can be characterised by its moderately broad whorls, the blunt keel, and the narrow to slightly perspective umbilicus. A similar but unnamed form inhabits the Dodecanese Islands and the western coast of Turkey. It has a somewhat sharper keel and a wider umbilicus if compared to *lentiformis*. The form *piligera* is intermediate between the forms *elia* and *lentiformis*. It lives in Viotía, Fthiótida and on the Island Évvia. It differs by a more tightly coiled shell, the whorls which are more rounded (surface and subsurface), and the only slightly perspective umbilicus.

Distribution (Fig. 15): *Lindholmiola lens* inhabits quite a large area. It is known from the Ionian Islands of Kefallinia and Zakynthos, the Pelopónnisos, the islands of the Aegean Sea to the western part of Turkey. In the north, it is recorded from the Bay of Korinthos, and the eastern part of continental Greece to the western part of the Halkidikí Peninsula.

***Lindholmiola barbata* (A. FÉRUSSAC, 1821)** Figs 1, 16–18, 19, 45

1821 *Helix barbata* A. FÉRUSSAC, Tableaux systématiques des animaux mollusques classés en familles naturelles: 41 (Folio) or 37 (Quarto), Nr. 152 [partim].

1832 *Helix barbata* α , – A. Férussac, (in A. Férussac & Deshayes), Histoire naturelle générale et particulière des mollusques terrestres et fluviatiles (Atlas), 22–27: T. 66, F. 3 [Lectotype, design. Gittenberger & Groh, 1986] + Expl. pl.: ij.

1837 *Helix (Caracollina) barbata*, – Beck, Index molluscorum praesentis aevi musei principis augustissimi Christiani Frederici: 28.

1848 *Helix corcyrensis* ?, – L. Pfeiffer, Monographia heliceorum viventium, 1: 415, Nr. 1080 [partim, nec Syn. pro *H. barbata* FÉRUSSAC; non *H. corcyrensis* Rossmäessler, 1838].

1859 *Helix barbata*, – Mousson, Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich, 4: 258.

1859 *Helix corcyrensis*, – L. Pfeiffer, Monographia heliceorum viventium, 4: 312, Nr. 2004 [partim, nec Syn. pro *H. barbata* α FÉRUSSAC, 1832; non *H. corcyrensis* Rossmäessler, 1838].

1868 *Helix barbata*, – L. Pfeiffer, Monographia heliceorum viventium, 5: 415.

1876 *Helix barbata*, – L. Pfeiffer, Monographia heliceorum viventium, 7: 467.

1879 *Helix (Trigonostoma) lens* var. *barbata*, – Westerlund & Blanc, Aperçu sur la faune malacologique de la Grèce inclus l'Épire et la Thessalie: 35.

1887 *Helix (Caracolina) barbata*, – Tryon, Manual of Conchology, 3: 118.

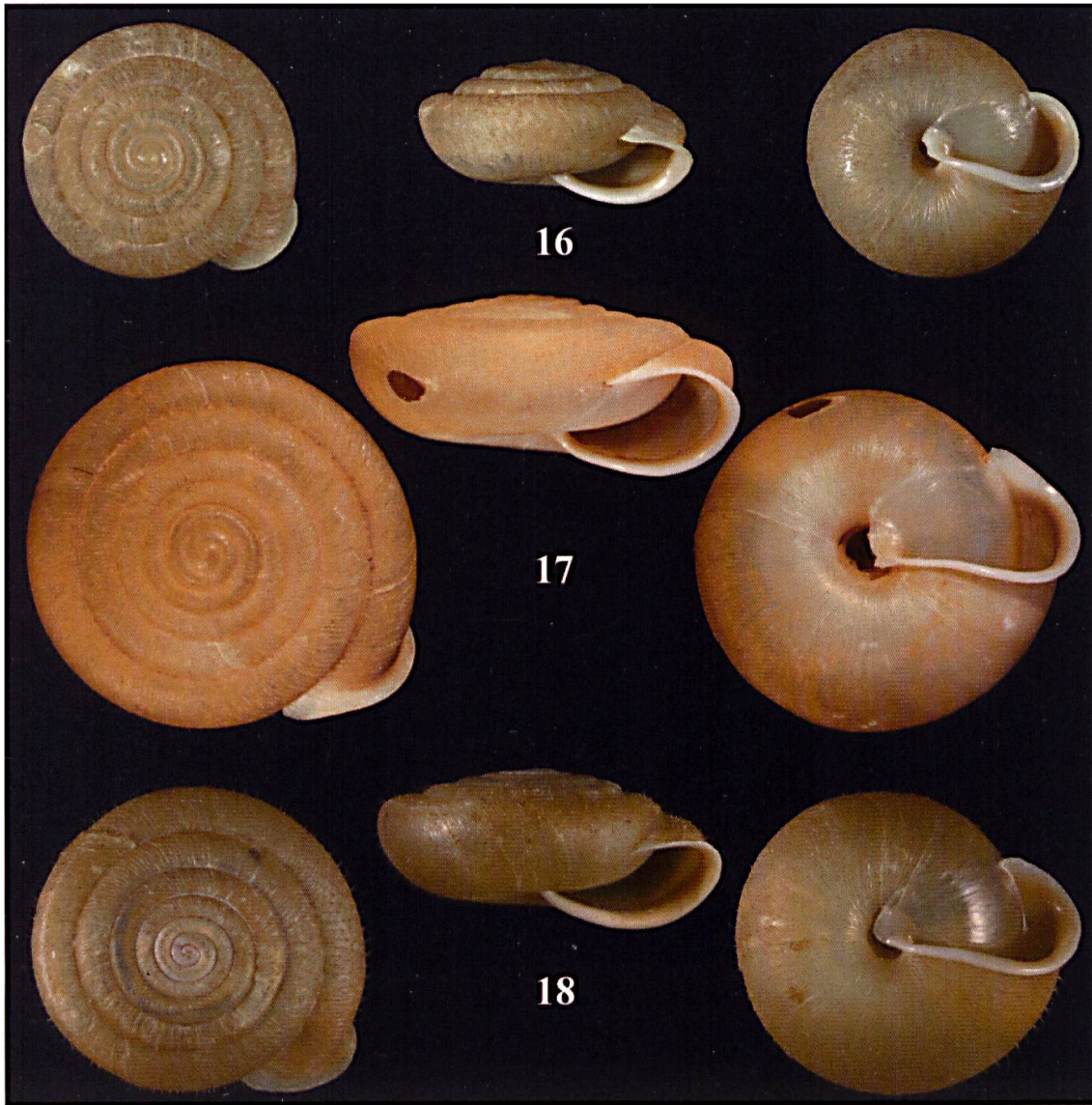
- 1889 *Helix (Gonostoma) lens* var. *barbata*, – Martens, Archiv für Naturgeschichte, 55 (1): 186, 229.
- 1889 *Helix (Caracolina) barbata*, – Westerlund, Fauna der in der paläarktischen Region lebenden Binnenconchylien, 2: 20 [partim].
- 1894 *Helix barbata*, – O. Boettger, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 26: 2.
- 1894 *Helix (Caracollina) barbata*, – Pilsbry, Manual of Conchology, 9: 228.
- 1904 *Helix (Gonostoma) barbata*, – Sturany, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 36: 108.
- 1918 *Caracollina barbata*, – Hesse, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 50: 109.
- 1978 *Helix (Gonostoma) barbata*, – Seidl, Mitteilungen der Zoologischen Gesellschaft Braunau, 3 (5/7): 160.
- 1986 *Lindholmiola barbata*, – Gittenberger & Groh, Archiv für Molluskenkunde, 116 (4/6): 222, Abb. 1 b (= 3).
- 1990 *Lindholmiola barbata*, – Fechter & Falkner, Steinbachs Naturführer: 222.
- 1991 *Lindholmiola barbata*, – Maassen, De Kreukel, 27 (1/2): 9, Taf. 1.

Diagnosis: depressed, brown to yellowish shell; covered with yellowish hairs; last whorl with a blunt peripheral keel; umbilicus cylindrical, partly covered.

Description of shell: shell depressed, basic colour brown to yellowish; protoconch 1–1¼ smooth whorls; initial teleoconch whorls with a very fine radial sculpture, riblets slightly wavy (under strong magnification), inconspicuous on the last whorl; teleoconch surface (except the initial whorls) covered by fine granules and with small hair knuckles; hairs yellowish, 0.3–0.8 mm long (shorter in the umbilicus), permanently fixed to the shell; 5¼–6¾ regularly increasing whorls, depressed above, rounded below, with a blunt peripheral keel; suture of medium depth; umbilicus almost cylindrical, slightly increasing in the last whorl, diameter 1.25–2 mm, partly covered by the columellar reflection of the peristome; aperture oblique, slightly curved in lateral view; in frontal view subquadrate, peristomial insertions with a gap of 2.8–5.8 mm; parietal callus lacking; peristome sharp, laterally broadened and slightly reflected basally; columellar reflection of peristome broad, covering ¼ of the umbilicus (in adult shells).

Measurements: H: 4.2–6.25; D: 9.7–14.4; aH: 3.75–5.8 (2–3.6); aW: 5.1–8.3.

Details of body (n = 5, Crete, Bay of Soúda (= E of Haniá)): head and dorsum grey to greyish brownish, flank and foot sole laterally grey to beige; mantle collar irregularly greyish pigmented; parallel to the ureter, small elongated greyish spots present (sometimes fused to a stripe); secondary ureter opens 0.5 mm from the respiratory pore.



Figs 16–18. *Lindholmiola barbata*. Fig. 16: NMBE 515636, Island Kríti, Nomos Iráklío, valley E from the airport Iráklío (small rounded form), D = 9.66 mm; Fig. 17: NMBE 515635, Island Kríti, Nomos Haniá, canyon ca. 4 Km N of Thériso (large flat form), D = 13.78 mm; Fig. 18: NMBE 515581, Rethimnon, Zousidi, 09.04.1993, leg. N. Chalwatzis, D = 12.49 mm. — All photos Neubert/Bochud, × 3.

Morphology of the genital organs: penis short with a slightly broadened distal part; glandular tissue covering almost half of the penial tube; proximal penial lumen with broad and shallow pilasters; distal penial lumen with two raised, parallel pilasters; several shorter longitudinal folds parallel to or between the major distal pilasters; vagina of moderate length; glandula reaches 2/3 of the length of the bursa copulatrix, with a short stem and a strong sculpture of crossing furrows; pedunculus of bursa copulatrix and the slightly broadened vesicle of same length; interior of the terminal genital organs with four to five well pronounced pilasters starting at the genital pore and fusing to a thickened area in the centre of the atrium; this area connects to a single long pilaster stretching into the vaginal lumen.

Differential diagnosis: *Lindholmiola corcyrensis* is conchologically quite close, but differs by its more tightly coiled whorls, its coarser growth ribs on the surface, its deeper suture, and the umbilicus, which is only slightly covered by the columellar callus. Its aperture is more strongly bent in lateral view, and the peristome is broader. In *L. corcyrensis*, the penial lumen is filled by v-shaped, obliquely arranged short folds.

Forms of *L. lens* with rounded whorls are also similar to *L. barbata*. However, shells of *L. lens* of the same size differ by having an additional whorl, coarser growth ribs, a deeper suture, and an almost completely open umbilicus. Their aperture is more bent in frontal view. In *L. lens*, the short folds in the proximal penial lumen are usually missing, and the pilasters in the distal lumen are weaker.

Specimens examined (all Greece, Island of Crete):

Nomos Haniá: Plátanos, UTM GE 32, leg. Butot & Subai 10.2.1981, S 17518/8+1(juv.); leg. Kiss & Pintér 13.8.1988, HNHM 44682/1(juv.); Falásarna, N of the excavations, UTM GE 33, leg. Neuteboom 5.4.1984, NNM/2+2(juv.); coast 2.5 km S of Falásarna, UTM GE 33, leg. Butot & Subai 10.2.1981, S 17519/6; Kotsoumatádos (= S of Topólia) UTM GE 42, leg. Maassen 4.1987, Maa/1; N boundary of Kakópetros, UTM GE 42, leg. Drimmer, Pintér & Varga 25.7.1994, HNHM 43541/1+1; Rodopós (= SW of Afráta) UTM GE 43, leg. Drimmer, Pintér & Varga 24.7.1994, HNHM 43540/1+2(juv., Bruchst.); Giflos river drift close to Kaloudianá and under stones, UTM GE 43, leg. Butot & Subai 10.2.1981, S 14099/1+6(juv.); 1 km N of Soúgia, UTM GE 50, leg. Drimmer, Pintér & Varga 25.7.1994, HNHM 43542/1(juv.); 1 km N of Prasés, UTM GE 51, leg. Kiss & Pintér 14.8.1988, HNHM 44683/3+1(juv.); 1 km S of Tavronítis (= S of Kolimvári) UTM GE 53, leg. Maassen 4.1987, Maa/3; N boundary of Kolimvári, UTM GE 53, leg. Maassen 4.1987, Maa/6; 1 km N of Kolimvári, UTM GE 53, leg. Drimmer, Pintér & Varga 24.7.1994, HNHM 43539/1+1(juv., Bruchst.); 2 km N of Kolimvári, UTM GE 53, leg. Kiss & Pintér 13.8.1988, HNHM 44681/1; between Kolimvári and Afráta, 700 m on a path to W, UTM GE 53, leg. Butot & Subai 11.2.1981, S 17516/3 (juv.); 1 km N of Afráta, UTM GE 54, leg. Pintér & Varga 25.7.1992, HNHM 45252/1 (juv.); N boundary of Omalós, UTM GE 61, leg. Drimmer, Pintér & Varga 25.7.1994, HNHM 43543/1; 3 km S of Chiliaró, UTM GE 62, leg. Drimmer, Pintér & Varga 25.7.1994, HNHM 43544/1 (juv.); Mesklá, at the bridge at the affluent of two creeks, UTM GE 62, leg. Butot & Subai 8.2.1981, S 17522/3+2(juv.)+1(juv. alk.); Mesklá, at both churches, UTM GE 62, leg. Butot & Subai 8.2.1981, S 17521/4+3 (juv.)+2(alk.); Thériso, old church, UTM GE 72, leg. Butot & Subai 11.2.1981, S 17515/1; 1 km N of Thériso, on limestone rocks, UTM GE 72, leg. Maassen 10.1992, Maa/2; 2 km N of Thériso, on limestone rocks, UTM GE 72, leg. Maassen 10.1992, Maa/2; canyon ca 4 km N of Thériso, on limestone rocks, UTM GE 72, leg. Butot & Subai 11.2.1981, S 14100/69+12 (juv.)+1 (alk.); leg. Maassen 10.1992, Maa/4; canyon 5.7 km of Thériso in direction to Haniá, UTM GE 72, leg. Butot & Subai 11.2.1981, S 17514/10; canyon 7.6 km of Thériso in direction to Haniá, UTM GE 72, leg. Butot & Subai 11.2.1981, S 17517/5+1 (juv.); 7 km E of Anópoli, UTM KU 39, leg. Maassen 4.1990, Maa/1; canyon 1.2 km of Sfakia in direction to Anópoli, on limestone rocks, UTM KU 39, leg. Butot & Subai 9.2.1981, S 14102/3+5 (juv.); Haniá (=

Chania, Kanea) UTM KV 23, SMF 101959/1, 207801/1; Haniá, on the walls of the castle, UTM KV 23, leg. Butot & Subai 8.2.1981, S 17523/14+2 (juv.)+27 (alk.); canyon "Farangi N., Venizéλου" UTM KV 23, leg. Drimmer, Pintér & Varga 27.7.1994, HNHM 43548/10+6 (juv.), 43549/2+2 (juv.), 43550/30 (adult+juv.); boundary of Anópoli, in direction to Sfakia, UTM KV 30, leg. Butot & Subai 9.2.1981, S 17520/1; Chorafia (= SE of Haniá) UTM KV 32, leg. Drimmer, Pintér & Varga 28.7.1994, HNHM 43551/2+1 (juv.); Haniá–Stérnes road, at the crossing to Souída, UTM KV 33, leg. Butot & Subai 12.2.1981, S 17512/3+6 (alk.); peninsula Akrotíri, Aróni, UTM KV 33, leg. Kiss & Pintér 16.7.1986, HNHM 29879/6; peninsula Akrotíri, Kalavás, UTM KV 33, leg. Drimmer, Pintér & Varga 27.7.1994, HNHM 43547/2; peninsula Akrotíri, 3 km NW from the airport, UTM KV 33, leg. Drimmer, Pintér & Varga 27.7.1994, HNHM 43545/2+1 (juv.); Bay of Souída, 100–150 m of the rivermouth, S from the English cemetery, UTM KV 33, leg. Butot & Subai 12.2.1981, S 14104/6+3 (juv.)+61(alk.)+3 (juv. alk.); Asígonia (= Gonia), UTM KV 40, leg. Drimmer, Pintér & Varga 20.7.1994, HNHM 43524/1; 2 km S of Vrises (= in direction to Sfakia) UTM KV 41, leg. Maassen 4.1990, Maa/1; 10.4 km of Askýfou in direction to Vrises, on limestone rocks UTM KV 41, leg. Butot & Subai 9.2.1981, S 14101/19+6 (juv.); between Kalamítsi and Amigdáli, UTM KV 41, leg. Drimmer, Pintér & Varga 23.7.1994, HNHM 43534/1+1; 2 km W of Georgioúpoli, UTM KV 41, leg. Maassen 10.1992, Maa/8; 3 km W of Georgioúpoli, UTM KV 41, leg. Maassen 4.1990, Maa/23; 2 km E of Neo Horió, UTM KV 42, leg. Maassen 4.1990, Maa/10; at the N boundary of Kefalás, UTM KV 42, leg. Butot & Subai 12.2.1981, S 17513/4; leg. Drimmer, Pintér & Varga 23.7.1994, HNHM 43536/1; hill slope SE of Kalámi, UTM KV 42, leg. Drimmer, Pintér & Varga 23.7.1994, HNHM 43538/1+1 (juv.); Xirostérni, UTM KV 42, leg. Drimmer, Pintér & Varga 23.7.1994, HNHM 43535/1; N boundary of Drápanos, UTM KV 42, leg. Drimmer, Pintér & Varga 23.7.1994, HNHM 43537/3; peninsula Akrotíri, 2 km N of Agia Triáda, UTM KV 42, leg. Drimmer, Pintér & Varga 27.7.1994, HNHM 43546/1; peninsula Akrotíri, 1 km N of Moni Gouvernétoú, UTM KV 44, leg. Maassen 4.1987, Maa/2; between Georgioúpoli and Exópoli, UTM KV 51, leg. Drimmer, Pintér & Varga 23.7.1994, HNHM 43533/5+7 (juv.); W boundary of Geourgioúpoli, UTM KV 51, leg. Kiss & Pintér 17.7.1986, HNHM 29876/26+18 (juv.); rock face along the motorway close to Georgioúpoli, UTM KV 51, leg. Maassen 4.1987, Maa/26; NW of Kournás, UTM KV 51, leg. Drimmer, Pintér & Varga 20.7.1994, HNHM 43528/3+1 (juv.); on the shore of the Kourna Lake (= W of Episkopí) under stones, UTM KV 51, leg. Butot & Subai 12.2.1981, S 14103/32+18 (juv.)+6 (alk.)+2 (juv. alk.); leg. Maassen 4.1987, Maa/4.

Nomos Réthimno: 1 km N of Assomatos (= SW of Spíli) UTM KU 69, leg. Maassen 10.1992, Maa/2; hill slope in the village of Agía Galíni, on rocks, UTM KU 88, leg. Pintér & Subai 10.8.1976, S 3828/1; 4 km S of Ágios Ioánnis, UTM KU 99, leg. Maassen 10.1992, Maa/1 (juv.); road crossing close to Ágios Konstantínos, UTM KV 60, leg. Drimmer, Pintér & Varga 20.7.1994, HNHM 43527/3+1 (juv.); Atsipopoulo (= W of Réthimno) UTM KV 61, leg. Drimmer, Pintér & Varga 20.7.1994, HNHM 43523/1; between Kato Valsamónero and Ágios Andréas, UTM KV 61, leg. Drimmer, Pintér & Varga 20.7.1994, HNHM 43525/1; road crossing close to Kaloníktis, UTM KV 61, leg. Drimmer, Pintér & Varga 20.7.1994, HNHM 43526/1; 2 km W of Ágios Andréas, UTM KV 61, leg. Kiss & Pintér 17.7.1986, HNHM 29877/20+15 (juv.); E of Geráni (= W of Réthimno) at the cave, UTM KV 61, leg. Maassen 4.1987, Maa/7; river Pétres (= 9 km W of Réthimno) UTM KV 61, leg. Butot & Subai 11.2.1981, S 17511/1; leg. Maassen 4.1990, Maa/6; 1 km S of Réthimno, UTM KV 71, leg. Kiss & Pintér 15.7.1986, HNHM 29878/1 (juv.); 3 km S of Réthimno, UTM KV 71, leg. Drim-

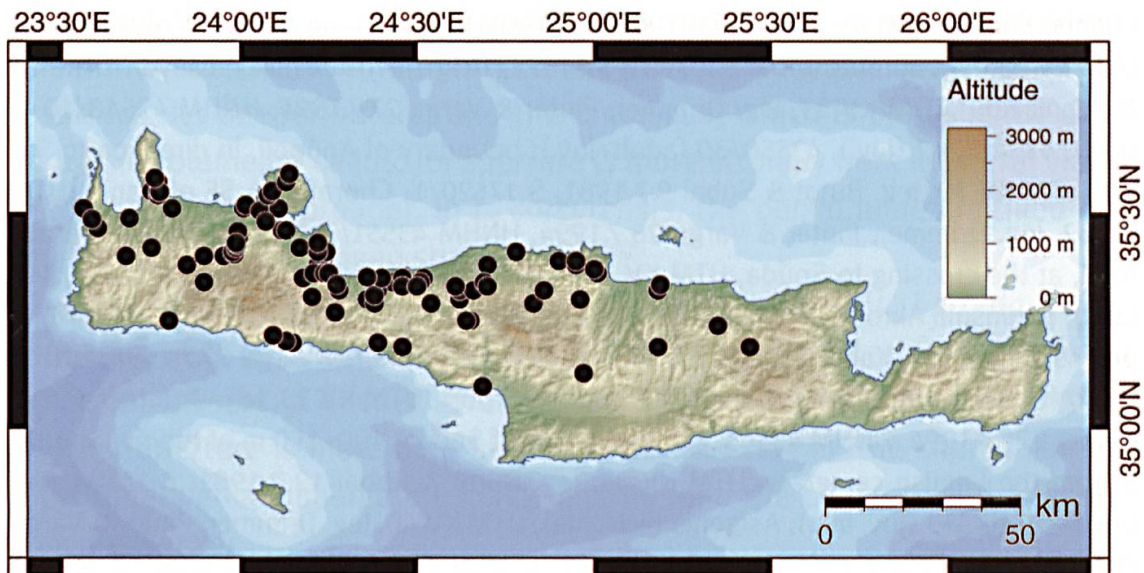


Fig. 19. Distribution of *Lindholmiola barbata*.

mer, Pintér & Varga 20.7.1994, HNHM 43522/2+2 (juv.); canyon 5 km SE of Réthimno, at the bridge, UTM KV 71, leg. Maassen 10.1992, Maa/1; 2 km S of Prasiés, UTM KV 71, leg. Maassen 10.1992, Maa/1; S boundary of Xeró Horió, UTM KV 71, leg. Maassen 4.1990, Maa/12; 2 km S of Xeró Horió, UTM KV 71, leg. Maassen 4.1990, Maa/1 (juv.); 2 km E of Apóstoli, UTM KV 80, leg. Maassen 10.1992, Maa/3; S boundary of Kalógeros, UTM KV 80, leg. Kiss & Pintér 14.8.1988, HNHM 44684/1; Monastir Arkadí, on walls, UTM KV 81, leg. Maassen 10.1992, Maa/2; 1 km N from the Monastir Arkadí, UTM KV 81, leg. Maassen 10.1992, Maa/3; in the village of Eléftherna, UTM KV 81, leg. Drimmer, Pintér & Varga 22.7.1994, HNHM 43530/4; 0.5 km N of Amnátos, UTM KV 81, leg. Drimmer, Pintér & Varga 20.7.1994, HNHM 43529/1; 1 km N of Pérama, UTM KV 91, leg. Maassen 10.1992, Maa/3; leg. Drimmer, Pintér & Varga 22.7.1994, HNHM 43532/2; rocks at the N boundary of Orthés, UTM KV 91, leg. Maassen 10.1992, Maa/1; SE boundary of Orthés, UTM KV 91, leg. Drimmer, Pintér & Varga 22.7.1994, HNHM 43531/2 (juv.); Bali, UTM KV 92, leg. Maassen 1.1993, Maa/1; 3 km W of Anógia, UTM LV 00, leg. Maassen 4.1990, Maa/1; at the boundary of Aímonas, UTM LV 01, leg. Drimmer, Pintér & Varga 11.7.1994, HNHM 43521/2+1 (juv.); 1 km SE of Sises (= in direction to Achláda) UTM LV 11, leg. Drimmer, Pintér & Varga 11.7.1994, HNHM 43520/2+4.

Nomos Iráklío: 1 km W of Panassós (= S of Ágia Varvára) UTM LU, 18, leg. Maassen 10.1992, Maa/1; Houdétsi, UTM LU 39, leg. Maassen 10.1991, Maa/1; 2 km of Astiráki in direction to Tílisos, UTM LV 10, leg. Maassen 10.1992, Maa/4; Park in Fódele, UTM LV 11, leg. Maassen 10.1992, Maa/2; 1 km N of Fódele, UTM LV 11, leg. Maassen 10.1992, Maa/1; Rodiá, UTM LV 21, leg. Maassen 10.1991, Maa/2; "Tris Ekklesias" close to Rodiá, UTM LV 21, leg. Drimmer, Pintér & Varga 11.7.1994, HNHM 43519/1+4 (juv.); E of Iráklío, at the crossing the road to Prasás, UTM LV 31, leg. Maassen 4.1990, Maa/4; leg. Maassen 1.1993, Maa/4; valley E from the airport of Iráklío, on limestone rocks, under stones, UTM LV 31, leg. Butot & Subai 13.2.1981, S 14098/14+16 (juv.)+5 (alk.)+1 (juv., alk.); 4 km N of Kastéli, UTM LV 50, leg. Maassen 4.1990, Maa/2.

Nomos Lassíthi: Vidiáni, UTM LU 59, leg. Pintér & Varga 3.7.1993, HNHM 45291/1 (juv.).

Remarks: Concerning both, size and shell shape, *L. barbata* does not vary considerably. In this species, no local forms are known.

Distribution (Fig. 19): This species is endemic to the Island of Crete, where it occupies the Lassíthi-plane towards the central and western part of the island.

***Lindholmiola corcyrensis* (ROSSMÄSSLER, 1838)** Figs 20–23, 24–25, 27, 29

1828 *Helix contorta*, – Menke, Synopsis methodica molluscorum generum omnium et specierum earum, quae in Museo Menkeano adservantur: 10 (nomen nudum, homonym of *Helix contorta* LINNAEUS, 1758).

1837 *Helix (Caracollina) corcyrensis* BECK, Index molluscorum praesentis aevi musei principis augustissimi Christiani Frederici: 28 (nomen nudum).

1838 *Helix (Helix) corcyrensis*, – Anton, Verzeichniss der Conchylien welche sich in der Sammlung von Hermann Eduard Anton befinden: 39, No. 1428 (nomen nudum).

1838 *Helix (Helix) canalifera* ANTON, Verzeichniss der Conchylien welche sich in der Sammlung von Hermann Eduard Anton befinden: 39, No. 1427. Locus typicus: "Corfu" (nomen oblitum).

1838 *Helix contorta* [*H. corcyrensis*] ROSSMÄSSLER, Iconographie der Land- & Süsswasser-Mollusken mit vorzüglicher Berücksichtigung der europäischen noch nicht abgebildeten Arten, (1) 2 (1/2): 40, Taf. 39, Fig. 538. Locus typicus: "Corfu". Type material: lost [(partim, not the variety minor = *girva* FRIVALDSZKY, 1835) (homonym of *Helix contorta* LINNAEUS, 1758)].

1839 *Helix corcyrensis*, – Deshayes in Férussac & Deshayes, 1820–1851: Histoire naturelle générale et particulière des mollusques terrestres et fluviatiles, 1: 21 (Taf. 69 E, Fig. 1–5 published in, 1840).

1846 *Helix corcyrensis*, – L. Pfeiffer, In: Martini & Chemnitz, Systematisches Conchylien-Cabinet, (1) 12 (II): 103, Taf. 16 Fig. 23–24.

1848 *Helix corcyrensis*, – L. Pfeiffer, Monographia heliceorum viventium, 1: 415.

1848 *Helix corcyrensis* var. γ . major, – L. Pfeiffer, Monographia heliceorum viventium, 1: 415.

1848 *Helix canalifera*, – L. Pfeiffer, Monographia heliceorum viventium, 1: 415.

1853 *Helix corcyrensis*, – L. Pfeiffer, Monographia heliceorum viventium, 3: 262.

1853 *Helix canalifera*, – L. Pfeiffer, Monographia heliceorum viventium, 3: 262.

1854 *Helix corcyrensis*, – Reeve, Conchologia Iconica, 7: species 1048.

1859 *Helix corcyrensis*, – Mousson, Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich, 4: 17, 256.

- 1859 *Helix corcyrensis* var. *octogyrata* Mousson, Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich, 4: 257.
- 1859 *Helix corcyrensis* var. *cefalonica* Mousson, Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich, 4: 29.
- 1859 *Helix corcyrensis* var. *canalifera*, – Mousson, Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich, 4: 17, 257.
- 1859 *Helix corcyrensis* var. *girva*, – Mousson, Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich, 4: 268 [non *girva* FRIVALDSZKY].
- 1859 *Helix corcyrensis*, – L. Pfeiffer, Monographia heliceorum viventium, 4: 312.
- 1859 *Helix canalifera*, – L. Pfeiffer, Monographia heliceorum viventium, 4: 312.
- 1868 *Helix corcyrensis*, – L. Pfeiffer, Monographia heliceorum viventium, 5: 415.
- 1873 *Helix corcyrensis* var. *canalifera*, – Martens, Malakozoologische Blätter, 20: 33.
- 1876 *Helix corcyrensis*, – L. Pfeiffer, Monographia heliceorum viventium, 7: 467.
- 1879 *Helix (Trigonostoma) corcyrensis*, – Westerlund & Blanc, Aperçu sur la faune malacologique de la Grèce inclus l'Épire et la Thessalie: 36.
- 1879 *Helix (Trigonostoma) corcyrensis* var. *cefalonica*, – Westerlund & Blanc, Aperçu sur la faune malacologique de la Grèce inclus l'Épire et la Thessalie: 36.
- 1879 *Helix (Trigonostoma) corcyrensis* var. *octogyrata*, – Westerlund & Blanc, Aperçu sur la faune malacologique de la Grèce inclus l'Épire et la Thessalie: 37.
- 1879 *Helix (Trigonostoma) corcyrensis* var. *canalifera*, – Westerlund & Blanc, Aperçu sur la faune malacologique de la Grèce inclus l'Épire et la Thessalie: 37.
- 1879 *Helix (Trigonostoma) corcyrensis* var. *girva*, – Westerlund & Blanc, Aperçu sur la faune malacologique de la Grèce inclus l'Épire et la Thessalie: 37 [non *girva* FRIVALDSZKY].
- 1882 *Helix corcyrensis*, – Hesse, Jahrbücher der Deutschen Malakozoologischen Gesellschaft, 9: 321.
- 1883 *Helix (Anchistoma) corcyrensis*, – O. Boettger, Jahrbücher der Deutschen Malakozoologischen Gesellschaft, 10: 316, 331.
- 1883 *Helix (Anchistoma) corcyrensis cefalonica*, – O. Boettger, Jahrbücher der Deutschen Malakozoologischen Gesellschaft, 10: 323.
- 1886 *Helix (Gonostoma) corcyrensis* var. *octogyrata*, – O. Boettger, Jahrbücher der Deutschen Malakozoologischen Gesellschaft, 13: 52.
- 1887 *Helix (Caracolina) corcyrensis*, – Tryon, Manual of Conchology, 3: 117.
- 1887 *Helix (Caracolina) corcyrensis* var. *cephalonica*, – Tryon, Manual of Conchology, 3: 118.
- 1887 *Helix (Caracolina) corcyrensis* var. *octogyrata*, – Tryon, Manual of Conchology, 3: 118.

- 1887 *Helix (Caracolina) corcyrensis* var. *canalifera*, – Tryon, Manual of Conchology, 3: 118.
- 1889 *Helix (Caracolina) corcyrensis*, – Westerlund, Fauna der in der paläarktischen Region lebenden Binnenconchylien, 2: 19.
- 1889 *Helix (Caracolina) corcyrensis* var. *octogyrata*, – Westerlund, Fauna der in der paläarktischen Region lebenden Binnenconchylien, 2: 19.
- 1889 *Helix (Caracolina) corcyrensis* var. *cephalonica*, – Westerlund, Fauna der in der paläarktischen Region lebenden Binnenconchylien, 2: 19.
- 1889 *Helix (Caracolina) corcyrensis* var. *canalifera*, – Westerlund, Fauna der in der paläarktischen Region lebenden Binnenconchylien, 2: 19.
- 1889 *Helix (Caracollina) corcyrensis*, – Martens, Archiv für Naturgeschichte, 55 (1): 172.
- 1891 *Helix (Gonostoma) corcyrensis*, – O. Boettger, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 23 (5/6): 83.
- 1894 *Helix (Gonostoma) corcyrensis*, – Sturany, Annalen des Kaiserlich-Königlichen Naturhistorischen Hofmuseums, 9 (3): 371 [partim].
- 1894 *Helix (Caracollina) corcyrensis*, – Pilsbry, Manual of Conchology, 9: 288.
- 1894 *Helix (Caracollina) corcyrensis* var. *cephalonica*, – Pilsbry, Manual of Conchology, 9: 288.
- 1894 *Helix (Caracollina) corcyrensis* var. *octogyrata*, – Pilsbry, Manual of Conchology, 9: 288.
- 1894 *Helix (Caracollina) corcyrensis* var. *canalifera*, – Pilsbry, Manual of Conchology, 9: 288.
- 1905 *Gonostoma corcyrensis*, – Sturany, in Paganetti-Hummel: Verhandlungen der kaiserlich-königlichen Zoologisch-Botanischen Gesellschaft in Wien, 1905: 119.
- 1915 *Helicodonta (Caracollina) contorta*, – Sturany & Wagner, Denkschriften der Kaiserlichen Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Klasse, 91: 31, Taf. 2, Fig. 7, a–c.
- 1918 *Caracollina corcyrensis*, – Hesse, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 50: 109.
- 1918 *Caracollina corcyrensis octogyrata*, – Hesse, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 50: 109.
- 1918 *Caracollina corcyrensis cephalonica*, – Hesse, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 50: 109.
- 1924 *Helicodonta (Caracollina) contorta*, – Polinski, Annales zoologici Musei Polonici Historiae Naturalis, 3 (3/4): 130.
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Diagnosis: shell depressed, shell surface covered by granulation, whorls slightly shouldered, penial lumen with a number of small, v-shaped pilasters only.

Description of shell: shell depressed, spire only slightly raised, shell colour light to chestnut brown; first $\frac{1}{2}$ to $\frac{3}{4}$ protoconch whorl smooth, then with a few fine radial stripes; the following teleoconch whorls with increasingly stronger stripes, but often reduced on the penultimate and last whorls; stripes may vary in strength to even form small riblets; on the subsurface of the shell, stripes usually weak and blurred; complete shell surface covered by a fine granulation giving the shell a dull appearance; sometimes with small hair warts (mainly on subsurface); shell covered by hairs, hairs in the umbilicus usually shorter than those on the rest of the shell, hair length at the shell's shoulder ca 0.4–0.7 mm; $5\frac{3}{4}$ – $7\frac{3}{4}$ regularly increasing, slightly shouldered whorls; last whorl slightly descending before the aperture, then abruptly curved downwards, the bent part in a brighter to white colour; suture deep; umbilicus of oval shape, cylindrical to slightly perspective, only slightly increasing at the beginning, with a rapid, almost double increase in the last whorl, reaching a diameter of 1.4–3.75 mm; aperture oblique, ear-shaped, apertural insertion with a distance of 2.3–5 mm, connected by a very thin, almost indiscernible callus; peristomial rim sharp, forming a strong lateral and weaker basal lip, with a small peristomial callus covering ca 1/10 of the umbilicus.

Measurements: H: 3.75–7.5; D: 7.8–15.9; aH: 3.4–7.2 (2–4.7); aW: 3.6–7.8.

Details of body (8 animals; eastern boundary of Stroúni/1, Island Lefkáda, Evgiros/3, Island Kefallinia, 1.5 km E of Sámi/4): head and dorsal body cream to grey or brown, with many intermediate colourations, becoming brighter in direction to the tail; foot sole cream to beige; mantle with small, elongate grey dots; secondary ureter opens 1–1.5 mm before the pneumostome, where it splits into two canals.

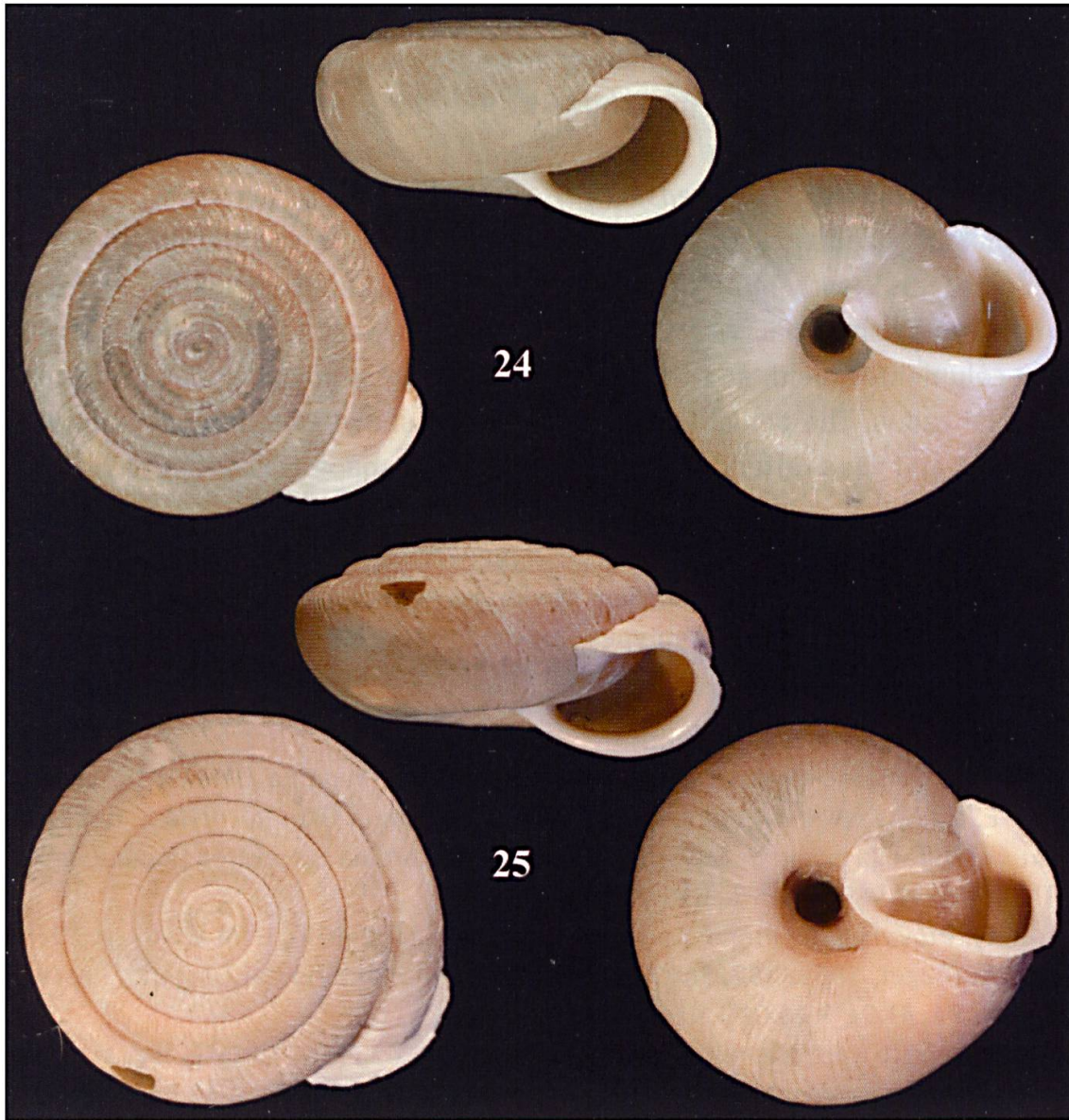
Morphology of the genital organs (Fig. 27): penis short, slightly inflated, ca half of its length is covered by penial glandular tissue, penial lumen with a number of small, v-shaped pilasters; vagina relatively long, glandula narrow, scarcely folded, reaching $\frac{2}{3}$ of the length of the bursa copulatrix, pedunculus and vesicle of the bursa copulatrix of the same length; atrial lumen filled



Figs 20–23. *Lindholmiola corcyrensis*. Fig. 20: NMBE 515620, Island Kérkira between Dassía and Káto Korakiána (form with narrow umbilicus, Ionian Islands), D = 10.8 mm; Fig. 21: NMBE 515622, Island Lefkáda, above Póros (small form), D = 9.19 mm; Fig. 22: NMBE 515621, Ipiros, Tímfi Mts., hiking path of Pápigo, 1–2 Km N of the shelter (large umbilicus, flat shell), D = 11.23 mm; Fig. 23: syn-type *Helix (Trigonostoma) corcyrensis* var. *cefalonica*, ZMZ 508737, Island Kefaloniá, "aux environs d'Argostoli, ...à Frangata et Grisata", D = 12.0 mm. — All photos Neubert/Bochud, × 3.

by two to three elevated and elongated pilasters with a few short secondary pilasters running in parallel, the major pilasters unite to form a large single pilaster filling almost the complete vaginal lumen.

Differential diagnosis: Conchologically, this species is close to *L. pirinensis*. However, it differs from that species by its more flattened whorls, its shallow



Figs 24–25. *Lindholmiola corcyrensis*. Fig. 24: syntype *Helix corcyrensis* var. *octogyrata*, ZMZ 508745, Ípiros, surroundings of Préveza, D = 14.36 mm; Fig. 25: NMBE 515623, Evritanía, mountain ca. 5 Km NE of Vráha (large form), D = 13.73 mm. — All photos Neubert/Bochud, × 3.

suture, and its less pronounced surface sculpture. Its radial riblets are quite regular, and its hairs are longer (although less permanent). As in *L. pirinensis*, the aperture is only slightly bent downwards, but in frontal view, the aperture of *L. pirinensis* is broader and larger. The apertural rim of *L. corcyrensis* is only slightly reinforced, and the umbilical shield less pronounced. In *L. pirinensis* (Fig. 26), the penial lumen shows only two large pilasters with one of them curved backwards forming a third, smaller pilaster.

Lindholmiola girva is quite similar, but the shell is smaller on average with more flattened whorls. However, in this species, the teleoconch whorls are more distinctly shouldered with the radial riblets being more pronounced. The

last whorl is narrower. The umbilicus formation in *L. girva* is similar, but here it is less perspective (almost circular) and not oval as in *L. corcyrensis*. Its aperture is narrower and sometimes shows a tooth-like swelling. As in *L. pirinensis*, *L. girva* shows two to three elongated penial pilasters, and thus can easily be distinguished from *L. corcyrensis*.

Similarly sized shells of *L. barbata* have a half to one additional whorl, *L. corcyrensis* is clearly more densely coiled. In addition, the shell of *L. barbata* is covered by small hair warts, its umbilicus is partially to completely covered by a columellar shield, and the aperture is less bent downwards with a weaker labial callus. The penial lumen of *L. barbata* shows two parallel elongated pilasters and thus differs profoundly from the v-shaped pilasters of *L. corcyrensis*.

Type specimens: Greece, Kefallinia Island, "aux environs d'Argostoli,...à Frangata et Grisata", 38.17°N 20.49°E, syntypes var. *cefalonica*: ZMZ 508737/6; "aux environs de Prèveza", 38.96°N 20.75°E, syntypes var. *octograta*: ZMZ 508745/5.

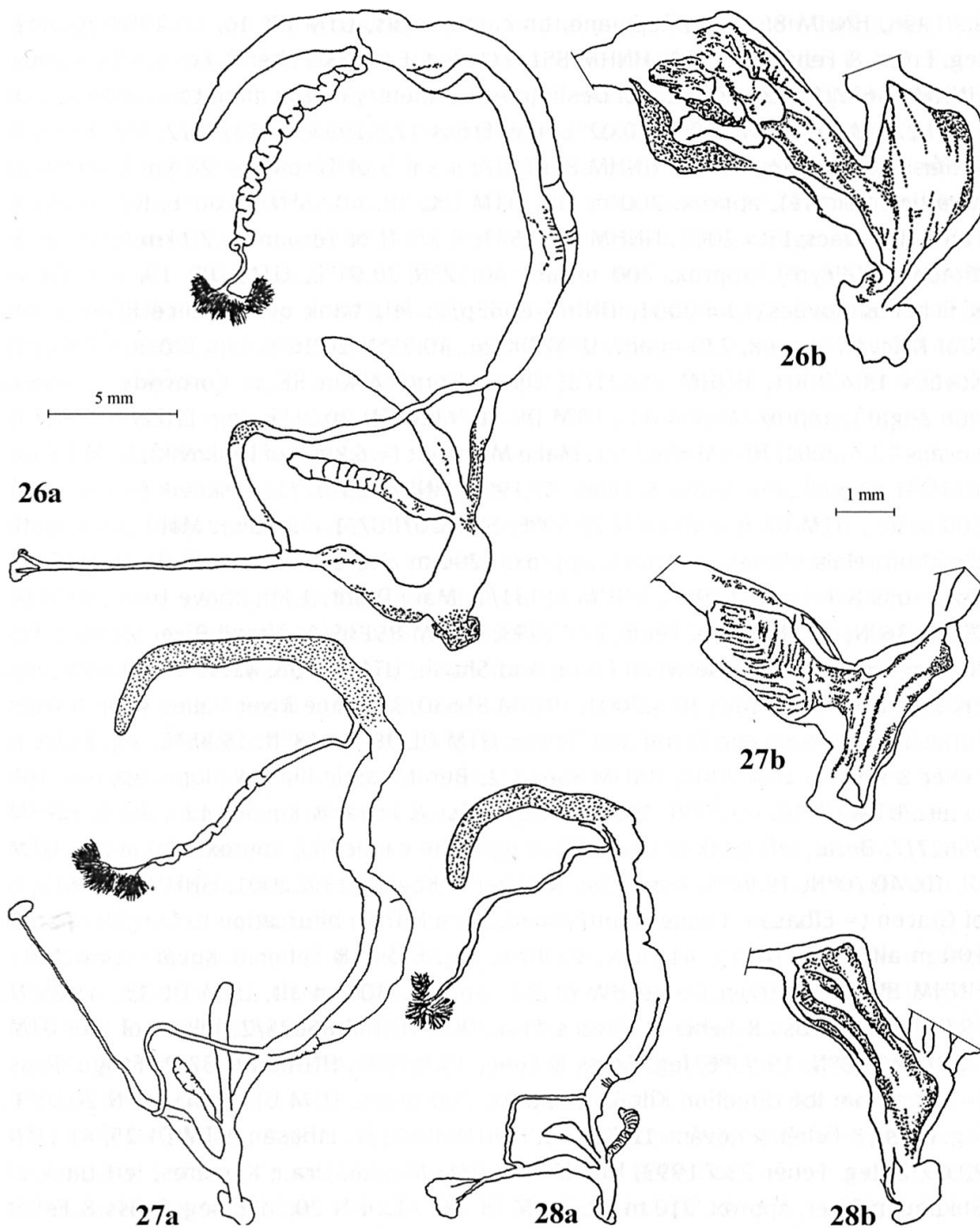
Additional specimens examined:

Croatia, Pelješac–Peninsula, sea floating debris near Prapatna, UTM YH 14, 42.81°N 17.67°E, leg. Maassen 4.1989, Maa/6; "Dalmatien, Zirona Grande", UTM n. det., SMF 284844/2; Badija Island (= Sv. Scoglia Badia) near Korčula Island, sea floating debris, UTM XH 75, 42.95°N 17.15°E, SMF 207804/1.

Italy, Prov. Foggia, Promontorio del Gargano, San Menáio, UTM WG 74, 41.93°N 15.94°E, (Paget, 1962: 182; Forcart, 1965: 141); Promontorio del Gargano, Péschici, UTM WG 84, 41.94°N 16.01°E, (Forcart, 1965: 141).

Montenegro, fortress near Vranjina, UTM CM 48, 42.27°N, 19.11°E, leg. Maassen 5.1984, Maa/1; Busovnik (= Mountain W of Podgorica), UTM CM 49, 42.44°N, 19.14°E, SMF 284837/3, 284865/1; Ulcinj, UTM CM 54, 42.93°N, 19.21°E, leg. Podani 20.8.1976, HNHM 21472/1 (juv.); Podgorica (= Titograd), UTM CM 59, 42.44°N, 19.26°E, SMF 101901/11; Šasko Lake, castle ruins, UTM CM 64, 41.97°N, 19.33°E, leg. Eröss & Fehér leg. 20.4.2000, HNHM 85624/8; Spuž, UTM CN 50, 42.51°N, 19.19°E, leg. Wohlberedt, 1933, SMF 101900/4; Zelenik (= Zelnik), UTM n. det., leg. Wohlberedt, 1905, SMF 284836/2, 284866/2.

Albania, valley of Povelë River S of Greshicë (= 15 +1 km SE of Ballsh), approx. 140–200 m alt., UTM CK 98, 40.54°N, 19.77°E, leg. Eröss, Fehér & Kovács 14.4.2001, HNHM 85619/4; Durrës (= Durazzo), UTM CL 67–77, 41.32°N, 19.44°E, SMF 207808/3; 24.9.1959, HNHM 83641/1; beach of Durrës, UTM CL 77, 41.31°N, 19.47°E, leg. Clauß, SMF 207805/3; Krujë, on castle walls, UTM CL 99, 41.5075°N, 19.7933°E, leg. Eröss & Fehér 2.7.1996, HNHM 85135/1; Shkodër (= Skutari), UTM CM 75, 42.07°N, 19.52°E, 1905, SMF 101928/11; leg. Barbanic, 1905, SMF 284873/15; leg. Wohlberedt, 1905, SMF 284863/1; leg. Flasch, 1906, SMF 284871/10; leg. Kormos, 1907, SMF 101926/4; Shkodër, castle hill, UTM CM 75, 42.0475°N, 19.4936°E, leg. Eröss & Fehér 1.7.1996, HNHM 85140/1; leg. Eröss & Fehér & Kovács 7.4.2001, HNHM 85623/3; Vau i Dejes (= approx. 20 km SE of Shkodër), UTM CM 85, 42.00°N, 19.63°E, leg. Eröss & Fehér



Figs 26–28. Genital organs of *Lindholmiola* species. Fig. 26: *Lindholmiola pirinensis*, a: situs, b: lumina of genital organs, Greece, Makedonía, Falakró Mts., 3 Km from the crossing Vólakas in direction to Skiing centre; Fig. 27: *Lindholmiola corcyrensis*, a: situs, Greece, Island Kefaloniá, 1.5 Km E of Sámi, b: lumina of genital organs, Greece, Island Lefkáda, 25 Km S von Lefkáda village; Fig. 28: *Lindholmiola reischuetzi*, a: situs, b: lumina of genital organs, Greece, Makedonía, 4 Km of Kehrókambos in direction to Stavroúpoli.

2.7.1996, HNHM/1; Pllanë (= N of Milot), 4 km E from bridge of Mat River, approx. 100 m alt., UTM CM 91, 41.70°N, 19.72°E, leg. Eröss & Fehér & Kovács 9.4.2001, HNHM 85620/3; rock walls at Borsh, UTM DK 03, 40.06°N, 19.85°E, leg. Eröss & Fehér

6.7.1996, HNHM 85142/1; Tepelenë, on castle walls, UTM DK 16, 40.29°N 20.02°E, leg. Erőss & Fehér 6.7.1996, HNHM 85141/1; leg. Erőss & Fehér & Kovács 14.4.2001, HNHM 85637/1; Tepelenë, Lavdi Deshmorevë cemetery on the mountain, approx. 260 m alt., UTM DK 16, 40.29°N 20.02°E, leg. Erőss 17.8.1993, S, 18263/2; leg. Erőss & Fehér & Kovács 14.4.2001, HNHM 85628/7; 4 km S of Tërpan (= 28 km from Berat direction Këlcyrë), approx. 700 m alt., UTM DK, 18, 40.54°N 20.00°E, leg. Erőss & Fehér & Kovács 13.4.2001, HNHM 85625/3; 4 km N of Tërpan (= 20 km from Berat direction Këlcyrë), approx. 700 m alt., 40.57°N 20.01°E, UTM DK, 19, leg. Erőss & Fehér & Kovács 13.4.2001, HNHM 85636/2; left bank of Dëshnicë River 5 km N of Këlcyrë, approx. 270 m alt., UTM DK 26, 40.35°N 20.16°E, leg. Erőss & Fehér & Kovács 13.4.2001, HNHM 85621/8; Osum Gorge 4 km SE of Çorovodë (= direction Zogas), approx. 400 m alt., UTM DK 38, 40.47°N 20.25°E, leg. Erőss & Fehér & Kovács 12.4.2001, HNHM 85622/1; Mal e Melesinit (= 6 km S of Leskovik), UTM DK 64, 40.10°N 20.59°E, leg. Erőss & Fehér 7.7.1996, HNHM 85132/1; Leskovik (= Lescovic), 800 m alt., UTM DK 64, 40.14°N 20.59°E, SMF 207807/1 + 1 (juv.); Mal i Dajtit, path direction relais station, on rocks, approx. 1200 m alt., UTM DL 07, 41.36°N, 19.91°E, leg. Erőss & Fehér 4.7.1996, HNHM 85131/1; Mal i Dajtit, 1 km above Linzë, UTM DL 07, 41.36°N, 19.88°E, leg. Fehér 27.7.1993, HNHM 85136/4; Tiranë River Valley 1 km N from Turkish bridge between Ferraj and Shtish, UTM DL 08, 41.39°N, 19.86°E, leg. Erőss & Fehér & Kovács 10.4.2001, HNHM 85630/3; Tiranë River Valley 4 km N from Turkish bridge between Ferraj and Shtish, UTM DL 08, 41.43°N, 19.85°E, leg. Erőss & Fehér & Kovács 10.4.2001, HNHM 85633/2; Berat, castle hill SW slope, approx. 100 m alt., UTM DL 10, 40.70°N, 19.94°E, leg. Erőss & Fehér & Kovács 12.4.2001, HNHM 85627/7; Berat, left bank of Osum River opposite castle hill, approx. 100 m alt., UTM DL 10, 40.70°N, 19.94°E, leg. Erőss & Fehér & Kovács 13.4.2001, HNHM 85626/5; S of Gracen (= Elbasan–Tiranë country road, 7 km N from bifurcation to Cërrik), approx. 500 m alt., UTM DL 15, 41.14°N, 19.96°E, leg. Erőss & Fehér & Kovács 14.4.2001, HNHM 85632/2; Erzen Gorge NW of Ibë, approx. 300 m alt., UTM DL 16, 41.25°N, 19.91°E, leg. Erőss & Fehér & Kovács 11.4.2001, HNHM 85635/2; hills S of Ibë, UTM DL 16, 41.23°N, 19.93°E, leg. Erőss & Fehér 15.9.1994, HNHM 85137/2; Fangul Pass (= 9 km from Ibë direction Kllojkë), approx. 700 m alt., UTM DL 16, 41.27°N 20.05°E, leg. Erőss & Fehér & Kovács 11.4.2001, HNHM 85631/1; Elbasan, UTM DL 25, 41.11°N 20.09°E, leg. Fehér 23.7.1993, HNHM 85039/1; Mirakë, Ura e Kamarës, left bank of Shkumbin River, approx. 210 m alt., UTM DL 36, 41.16°N 20.24°E, leg. Erőss & Fehér & Kovács 14.4.2001, HNHM 85629/1; on rocks above Tushemist at Ohrid Lake, UTM DL 72, 40.90°N 20.72°E, leg. Erőss & Fehér 7.7.1996, HNHM 85138/1; Pustec, bank of Prespa Lake, UTM DL 91, 40.79°N 20.91°E, leg. Fehér, 18.9.1992, HNHM 85139/1; Djelcic, UTM n. det., SMF 284845/1.

Fyrom, Crni Drim River left bank, N of Lukovo, on limestone rocksand in the soil, 630 m alt., UTM DL 67, 41.3544°N 20.6107°E, leg. Pintér, E. & P. Subai & Szigethy 17.07.1972, HNHM 49545/1 (juv.); Crni Drim River left bank, some km S of Lukovo, 630 m alt., UTM DL 67, 41.3398°N 20.6282°E, leg. Pintér, E. & P. Subai & Szigethy 17.07.1972, HNHM 49543/1, 85618/1, S 3848/1; 1 km SE of Džepišta (= direction Lukovo), 700 m alt., UTM DL 68, 41.4432°N 20.5374°E, leg. Pintér, E. & P. Subai & Szigethy 17.07.1972, HNHM 49544/1, S 3847/1; Sv.Naum, under stones, UTM DL 72, 40.9141°N 20.7412°E, leg. Maassen 5.1976, Maa/27, NNM/3; Galičica Mountains,

in forest 10 km from the crossing Carina–Sv. Naum–Ohrid direction Carina, on limestone rocks, 1560 m alt., UTM DL 83, 40.9618°N 20.8165°E, leg. Pintér, E. & P. Subai & Szigethy 14.07.1972, HNHM 49542/1 (juv.), S 3845/1; Galičica Mountains, pass 17 km from bifurcation at Trpejca direction Oteševo, 1600 m alt., UTM DL 83, 40.9553°N 20.8146°E, leg. Maassen 5.1976, Maa/16; at boat harbour of Trpejca, on limestone rocks and from Lake Ohrid, 700 m alt., UTM DL 83, 40.9584°N 20.7781°E, leg. Pintér, E. & P. Subai & Szigethy 16.07.1972, HNHM 49533/5 + 4 (juv.+ fragment), 85634/1, S 3841/6 + 1 (juv.); rocks N of boat harbour of Trpejca, UTM DL 83, 40.9591°N 20.7781°E, leg. Maassen 5.1975, Maa/1; Sv.Naum–Ohrid highway, bifurcation at Trpejca, UTM DL 83, 40.9439°N 20.7895°E, leg. Kiss & Pintér 4.7.1985, HNHM 30854/1 + 4 (juv. + fragment); Trpejca, UTM DL 83, 40.96°N 20.78°E, leg. Kiss & Pintér 5.7.1985, HNHM 30855/1; between Trpejca and Peštani, UTM DL 83, 40.98°N 20.80°E, leg. Kiss & Pintér 5.7.1985, HNHM 30856/1; on limestone rocks at shore of Lake Ohrid approx. 2.5 km S of Peštani, 710 m alt., UTM DL 83, 40.9981°N 20.8007°E, leg. Pintér, E. & P. Subai & Szigethy 16.07.1972, HNHM 49531/1 + 4 (juv.), S 3840/3; leg. Maassen 5.1975, Maa/1; 1 km S of Peštani, 800–1000 m alt., UTM DL 83, 40.9980°N 20.8025°E, leg. Maassen 5.1975, Maa/10; bank of Ohrid Lake S of Peštani, on limestone rocks, UTM DL 83, 41.0065°N 20.8050°E, leg. Pintér, E. & P. Subai & Szigethy 16.07.1972, HNHM 49534/1 + 1 (juv.), S 3843/3; Galičica Mountains W side, on limestone rocks in "Elešec" camping, 4 km N of Peštani and of Lake Ohrid before the camping, 750 m alt., UTM DL 84, 41.0386°N 20.8079°E, leg. Subai 11.–14.08.1971, S 3846/2; leg. Pintér, Subai & Szigethy 15.7.1972, HNHM 49532/3 + 4 (juv.), S 3844/2; above Sveti Stefan (= S of Ohrid), on rocks, 1100 m alt., UTM DL 84, 41.0757°N 20.8289°E, leg. Maassen 5.1975, Maa/2; tunnel near Orce Nikolov (= 6.5 km S of Ohrid), UTM DL 84, 41.05°N 20.80°E, leg. Maassen 5.1975, Maa/1; mountain slope at E border of Ohrid, UTM DL 85, 41.13°N 20.85°E, leg. Mikuska & Sipos 2.10.1975, HNHM 49549/1 (juv.).

Greece, Macedonia, 300 m N of Pefkófito, moist place in a small river gorge, approx. 1000 m alt., UTM DK 96, 40.2972°N 20.9566°E, leg. Subai 10.05.1995, S 15826/1; E slope of the mountain W of Pefkófito, on dry lime rocks, about 1200–1400 m alt., UTM DK 96, 40.2967°N 20.9433°E, leg. Subai 10.05.1995, S 15823/2; mountain E slope between Epáno and Káto Aréna (= W of Pefkófito), on limestone rocks, 1650 m alt., UTM DK 96, 40.2948°N 20.9381°E, leg. Subai 11.05.1995, S 15840/5; Grámmos Mountains, E side of Epáno Aréna mountain (= NW of Pefkófito), near the crest, 2000 m alt., UTM DK 96, 40.3455°N 20.8621°E, leg. Subai 15.07.1990, S 15872/4; Epáno Aréna Mountain (= NW of Pefkófito), mountain slope and ridge, on limestone rocks and under stones, 1750–2100 m alt., UTM DK 96, 40.3140°N 20.8972°E, leg. Subai & Szekeres 17.05.1997, S 15848/1; 15 km SW von Grevená, Landstrasse Zákas–Spíleo, an Kalkfelsen, 925 m alt., UTM EK 23, 40.0104°N 21.2832°E, leg. Gittenberger & Uit de Weerd 11.5.2000, NNM/4; Kastoriá, N part of peninsula, 620 m alt., UTM EK 28, 40.52°N 21.27°E, leg. Neuteboom 28.7.1979, NNM/1; Kastoriá, Monastir Panagia Mavriotissa, UTM EK 28, 40.5043°N 21.2804°E, leg. Neuteboom 28.7.1979, NNM/4; on the peninsula in Kastoriá, on limestone rocks approx. 50–100 m W of Monastir Panagia Mavriotissa, 640 m alt., UTM EK 28, 40.5050°N 21.2786°E, leg. Subai 14.07.1990, S 15877/46; at bridge 4 km SE of Vogatsikó, on limestone rocks, 680 m alt., UTM EK 37, 40.3983°N 21.4143°E, leg. Subai 10.05.1995, S 15824/28; in valley W of Gérmás, on limestone rocks, 850 m alt., UTM EK 37, 40.4528°N 21.4149°E, leg. Subai & Szek-

eres 17.05.1997, S 15849/51; Mikrá Prespa Lake, behind the biological station, approx. 200 m W of the W border of Mikrolímni, on limestone rocksand in a stone quarry, 885 m alt., UTM EL 01, 40.7419°N 21.1078°E, leg. Subai 13.07.1990, S 15878/2; leg. Subai leg.10.5.1995, S 15825/2. — Thessalía, 3–4 km from Diáva towards Koromiliá (= 4 km SW of Kalambáka), additional 400 m on a right path from the bifurcation, on limestone rocks, 550 m alt., UTM EJ 49, 39.68°N 21.58°E, leg. Gittenberger & Uit de Weerd 13.5.2000, NNM/3; NW border of Píli (= 18 km SW of Tríkala), on rocks at both sides of the Turkish arched bridge, 240 m alt., UTM EJ 56, 39.4597°N 21.6121°E, leg. Pintér, E. & P. Subai 28.07.1976, S 3812/1; Theópetra (= Kuvelci, 6 km SSE of Kalambáka), on limestone blocks of rocks at river bank, 260 m alt., UTM EJ 59, 39.6798°N 21.6810°E, leg. E. & P. Subai 26.07.1975, S 3813/1; Kalambáka, on conglomerate rocks beside the highway from Kalambáka to the Meteóra monasteries, 280 m alt., UTM EJ 59, 39.7103°N 21.6164°E, leg. Pintér, E. & P. Subai 29.07.1976, S 3814/1; Kastráki near Kalambáka, UTM EJ 59, 39.71°N 21.62°E, leg. Neuteboom leg.25.7.1979, NNM/2; at S border of Dafnospiliá, on limestone rocks beside the cave, 260 m alt., UTM EJ 84, 39.2274°N 21.9427°E, leg. Subai & Szekeres 12.05.1997, S 15814/2. — Kérkira Island (= Korfu), Paleokastrítsa, limestone rocks on elevations, 30 m alt., UTM CJ 89, 39.6708°N, 19.7019°E, leg. E. & P. Subai, 18.07.1975, S 3822/5; Neuteboom 6.10.1991, NNM/10 + 1 (juv.); Paleokastrítsa, Villa Reale, UTM n. det., SMF 284829/5; Pélekas (= Pelleka), UTM CJ 98, 39.59°N, 19.82°E, SMF 101933/2; on limestone rocks at S border of Ermónes bay, in rock debris, UTM CJ 98, 39.6086°N, 19.7758°E, leg. Subai 03.08.1995, S 15843/3; Vátos, bei Monastir Mirtiotíssa, UTM CJ 98, 39.5972°N, 19.7936°E, leg. Neuteboom 2.10.1991, NNM/1; Rand von Sokráki in Richtung Zigós, UTM CJ 99, 39.7168°N, 19.7977°E, leg. Neuteboom 3.10.1991, NNM/4 + 4 (juv.); Auf-fahrtweg zum Pantokrátor, 700 m alt., UTM CJ 99, 39.7499°N, 19.8428°E, leg. Neuteboom 3.10.1991, NNM/1; Áno Korakiana, UTM CJ 99, 39.70°N, 19.79°E, leg. Neuteboom 3.10.1991, NNM/1 (juv.); mountain approx. 1 km NW of Strinilas, on limestone rocks, 580 m alt., UTM CJ 99, 39.7464°N, 19.8294°E, leg. Subai 07.08.1995, S 15841/3; Análipis (= Analepsis), UTM CJ 99, 39.70°N, 19.82°E, SMF 284827/1; Ágios Márkos, UTM CJ 99, 39.71°N, 19.82°E, leg. Maassen 3.7.1980, Maa/1; 500 m E of Troumpéta (= Pandeimonas), N exposed rock holes at border of highway and on S exposed limestone rocks, 460 m alt., UTM CJ 99, 39.7092°N, 19.7531°E, leg. Subai 06.08.1995, S 14275/1 (juv.); in olive grove 1 km N of Nímfes, on limestone rocks beside the highway, 150 m alt., UTM CK 90, 39.7609°N, 19.7829°E, leg. Subai 01.08.1995, S 15837/31; 1.2 km S of Ág. Panteleimonas (= direction Episkepsis), on limestone rocks beside the highway, 240 m alt., UTM CK 90, 39.7734°N, 19.8267°E, leg. Subai 01.08.1995, S 15836/8; from Ágios Martínos direction Acharávi, UTM CK 90, 39.78°N, 19.83°E, leg. Neuteboom 3.10.1991, NNM/1; near road between Xathátes and Nímfes, UTM CK 90, 39.75°N, 19.77°E, leg. Neuteboom 4.10.1991, NNM/1 (juv.); 1.2 km ESE of Akharave, on corrugated karst rocks, 110 m alt., UTM CK 90, 39.7905°N, 19.8336°E, Subai 30.07.1995, S 15844/25; Ahillio, UTM DJ 07, 39.56°N, 19.90°E, SMF 101932/1; gegenüber Ahillio, UTM DJ 07, 39.56°N, 19.90°E, SMF 101930/2; Gardíki, byzantinische Festung, UTM DJ 07, 39.4770°N, 19.8848°E, leg. Neuteboom 12.10.1991, NNM/1 + 2 (juv.); 1.5 km N von Benítses, UTM DJ 07, 39.55°N, 19.91°E, leg. Gittenberger 9.1996, NNM/2 (alk.); 2 km S of Benitzes, on rocks in the vicinity of the sea, 20 m alt., UTM DJ 07, 39.5309°N, 19.9203°E, leg. E. & P. Subai, 19.07.1975, S 3818/5; "Santi

Deka", UTM DJ 07, 39.55°N, 19.88°E, SMF 101934/2; Ag. Déka Mountain (= W of Ag. Déka Village), on limestone rocks and under stones, 290 m alt., UTM DJ 07, 39.5548°N, 19.8819°E, leg. E. & P. Subai, 19.07.1975, S 3817/5; Kérkira Town (= Korfu), UTM DJ 08, 39.62°N, 19.91°E, HNHM 49548/1, SMF 284821/11, 284822/2, 284823/5, 284824/3, 284825/1, 284826/1, 284828/8 (juv.), 284830/1, 284840/12, 284841/9, 285672/2, 285673/1; Brömme leg., SMF 284848/1; leg. C. R. Boettger, 1906, SMF 101941/6; leg. Conéménos, SMF 101937/5; Krüper, 1883, SMF 101939/1; Stadt Kérkira, Fort (= Fortezza), UTM DJ 08, 39.62°N, 19.91°E, SMF 101931/2; Klosterruine bei Gouviá, UTM DJ 08, 39.65°N, 19.83°E, SMF 209373/5; Kanóni (= "Al Kanone"), UTM DJ 08, 39.59°N, 19.92°E, SMF 284842/8; "Mon Repos", UTM DJ 08, 39.60°N, 19.92°E, SMF 101935/1; between Dassia and Káto Korakiána, among roots of olive trees, 40 m alt., UTM DJ 09, 39.6830°N, 19.8314°E, leg. E. & P. Subai, 18.07.1975, S 3821/23; Pantokrátor [Mountain], UTM DJ 09, DK 00, 39.74°N, 19.87°E, leg. Brömme, SMF 284861/1; Pantokrátor mountain slope between Barbáti and Nissáki, among rock debris, 200 m alt., UTM DJ 09, 39.7249°N, 19.8776°E, leg. E. & P. Subai 20.07.1975, S 3819/4; Pantokrátor S slope above Nissáki, approx. 100 m W of Katsouíri cave, 200–250 m alt., UTM DJ 09, 39.7299°N, 19.8975°E, leg. Subai 06.08.1995, S 14276/7; S border of road 1.5 km from Petália direction peak of Pantokrátor, limestone rocks, 720 m alt., UTM DJ 09, 39.7521°N, 19.8452°E, leg. Subai 05.08.1995, S 14250/3 (juv.); mountain SE of Louítses, on broken karst rocks, 550 m alt., UTM DK 00, 39.7722°N, 19.8928°E, leg. Subai 02.08.1995, S 15842/3; Pantokrátor Mountain slope between Petália and Láfkí, on limestone rocks, 480 m alt., UTM DK 00, 39.7601°N, 19.8325°E, leg. E. & P. Subai 07.08.1975, S 3820/9; E slope of Pantokrátor karst plateau, 700 m alt., UTM DK 00, 39.74°N, 19.88°E, leg. Gittenberger 10.1978, NNM/1 (alk.). — Paxí Island (= Paxos), UTM n. det., SMF 284832/2; Gaïou (= Gaion), UTM DJ 23, 39.19°N 20.18°E, leg. K. L. Pfeiffer 4.1932, SMF 101911/11; rocks between Gaïou and Gaïou port, UTM DJ 23, 39.19°N 20.18°E, leg. Megens & Moorsel 14.5.2000, NNM/3. — Lefkáda Island (= Lefkas), between road and Evgiros (= 25 km S Lefkáda), 150–175 m alt., UTM DH 67, 38.62°N 20.65°E, leg. Gittenberger 21.10.1981, NNM/4 (alk.); Megáli Óros plateau, UTM DH 68, 38.72°N 20.62°E, SMF 279322/4; S border of Sivros, on limestone rocks along border of road, 170 m alt., UTM DH 68, 38.6668°N 20.6433°E, leg. E. & P. Subai 03.08.1975, S 3802/59; valley at Stavrotas Mountain (= W of Sivros), on limestone rocks, 200 m alt., UTM DH 68, 38.6704°N 20.6373°E, leg. E. & P. Subai 03.08.1975, S 3804/25; 7 km SE of Sivros (= direction Póros), on rocks beside a small chapel, 320 m alt., UTM DH 77, 38.6524°N 20.6850°E, leg. E. & P. Subai 03.08.1975, S 3806/2; above Póros, on limestone rocks, 300 m alt., UTM DH 77, 38.6419°N 20.7089°E, leg. E. & P. Subai 03.08.1975, S 3807/2; leg. Pintér & Subai 30.7.1976, S 3808/7; mountain slope 500–1000 m S of Nídri, under stones, 20 m alt., UTM DH 78, 38.6915°N 20.6979°E, leg. E. & P. Subai 03.08.1975, S 3805/43; 2 km from Kariá direction Lefkáda, on limestone rocks beside the highway, 440 m alt., UTM DH 79, 38.7756°N 20.6554°E, leg. E. & P. Subai 05.08.1975, S 3803/11; Fríni (= 2.5 km W of Lefkáda Town), UTM DH 79, 38.82°N 20.68°E, SMF 279321/6; leg. Gittenberger 22.10.1981, NNM/2 (alk.); border of Fríni (= direction Tsoukaládes), on limestone rocks beside asphalt road, 140 m alt., UTM approx. DH 69, 38.8236°N 20.6800°E, leg. E. & P. Subai 05.08.1975, S 6677/38; Kaligóni, between roots of olive trees, UTM DH 79, 38.8148°N 20.7124°E, leg. E. & P. Subai 31.07.1975, S 3811/15; Kaligóni, from the spring "Megali Vrysi" and on lime-

stone rocks beside the chapel, UTM DH 79, 38.8147°N 20.7119°E, leg. E. & P. Subai 01.08.1975, S 3809/21, 3810/8. — Kefaloniá Island, UTM n. det., SMF 101910/4, 284857/1; leg. Heldreich leg., SMF 284858/1; 6 km WNW of Lixoúri, UTM DH 43, leg. Visser 4.11.1985, NNM/1 (alk.); 1.5 km E of Sámi, UTM DH 73, leg. Visser 6.11.1985, NNM/5 (alk.). — Ípiros (= Epirus), S border of Igoumenítsa, on limestone rocks and from a spring, 40 m alt., UTM DJ 37, 39.4858°N 20.2818°E, leg. E. & P. Subai 21–22.07.1975, S 3828/1; above Pléssio, on lime conglomerate rocks, 450 m alt., UTM DJ 38, 39.6493°N 20.2811°E, leg. Subai 13.05.1995, S 15832/2; mountain slope approx. 2 km N of Kestríni (= NW of Igoumenítsa), on limestone rocks, 20 m alt., UTM DJ 38, 39.5745°N 20.1943°E, leg. Subai, 19.07.1990, S 15876/4; S border of Kótsika, on limestone rocks, under stones, 300 m alt., UTM DJ 39, 39.6592°N 20.2471°E, leg. Subai 13.05.1995, S 15834/4; Párga, Valtos Beach, on rocks near castle, UTM DJ 44, 39.2832°N 20.3970°E, leg. Megens & Moorsel 14.5.2000, NNM/1; 1.4 km N of Agiá (= N of Párga), on dry limestone rocks, 300 m alt., UTM DJ 45, 39.3202°N 20.3443°E, leg. Subai 15.05.1995, S 15830/1; Párga–Agiá country road, 600 m N of Anthoússa, UTM DJ 45, 39.3044°N 20.3679°E, leg. Hoenselaar 8.6.1996, Maa/2; Nekromanteion (= Ephyra), UTM n. det., leg. Hoenselaar 9.6.1996, Maa/2; 1 km N of Kartéri (= highway Margaríti–Igoumenítsa), on limestone rocks, 170 m alt., UTM DJ 46, 39.3953°N 20.3702°E, leg. Subai 20.07.1990, S 15829/2; leg. Subai & Szekeres 14–15.5.1997, S 15850/3; 5 km E of Igoumenítsa, mountain slope between Krióvrissi and Lákka Villages, under stones, 370 m alt., UTM DJ 47, 39.4882°N 20.3274°E, leg. E. & P. Subai 22.07.1975, S 3837/7; 2 km from Parapótamos direction Ioánina (= highway Igoumenítsa–Ioánina), on limestone rocks, 200 m alt., UTM DJ 47, 39.5297°N 20.3426°E, leg. E. & P. Subai 23.07.1975, S 3836/4; cave chapel 5 km from highway Filiátes–Igoumenítsa, direction Mavronéri, on limestone rocks, approx. 150–200 m alt., UTM DJ 48, 39.6434°N 20.3125°E, leg. Subai, 19.07.1990, S 15875/1; leg. Subai 13.5.1995, S 15833/4; leg. Subai & Szekeres 15.5.1997, S 15852/4; about 5 km SE of the highway Filiátes–Igoumenítsa (= direction Kipárisso, Paleohóri), approx. 100 m W of the bifurcation to Astós, beside the Thíamis river, on limestone rocks, 50 m alt., UTM DJ 48, 39.5673°N 20.3700°E, leg. Subai & Szekeres 15.05.1997, S 15853/3; 9.5 km from the highway Filiátes–Igoumenítsa direction Keramítsa, 900 m from the bifurcation to Rizó (= 1 km E of Dafni), on limestone rocks in the street bend, 300 m alt., UTM DJ 48, 39.6429°N 20.4095°E, leg. Subai & Szekeres 15.05.1997, S 15851/3; bifurcation of highway Filiátes–Keramítsa direction Rizó, from here still 2 km eastwards in a river bed, on limestone rocks, 250 m alt., UTM DJ 48, 39.6435°N 20.4164°E, leg. Subai, 19.07.1990, S 15874/6; S of Mórifi, junction to Párga, UTM DJ 54, 39.2958°N 20.4779°E, leg. Eröss 10.8.1977, HNHM 9003/4; 500 m from Ag. Kiriáki direction Párga (= bifurcation of highway Préveza–Igoumenítsa direction Párga), dry hill slope, on rocks, 160 m alt., UTM DJ 54, 39.2900°N 20.4415°E, leg. E. & P. Subai 06.08.1975, S 3830/5; 13 km from Vrossína direction Igoumenítsa, E slope of limestone mountain, 650 m alt., UTM DJ 58, 39.5944°N 20.4918°E, leg. Riedel & Subai 13.04.1988, S 15820/3; N of Glikí, along highway to Koukoulí, on limestone rocks, approx. 160 m alt., UTM DJ 65, 39.3322°N 20.6030°E, leg. Subai 15.05.1995, S 15831/1; small chapel at N border of Tsangári, on limestone rocks, 480 m alt., UTM DJ 66, 39.4202°N 20.6127°E, leg. Subai 15.05.1995, S 15827/3; river gorge at S border of Dovlá, on limestone rocks, 400 m alt., UTM DJ 68, 39.5679°N 20.5481°E, leg. Subai 13.05.1995, S 15835/1; Préveza,

UTM DJ 71, SMF 284846/1, 284855/3; leg. Conéménos, 1883, SMF 284850/4; leg. Conéménos, 1899, SMF 101912/7; Camping Kalamitsi Beach, 3 km N of Préveza, UTM DJ 71, 38.98°N 20.70°E, leg. Hoenselaar 4.6.1996, Maa/5; wall remains of Nikopolis (= N of Préveza), 20 m alt., UTM DJ 71, 39.0235°N 20.7367°E, leg. E. & P. Subai 06.08.1975, S 3831/2; along old highway Préveza–Igoúmenítsa, mountain slope 500 m from road junction to Zálongo direction Igoúmenítsa, on limestone rocks, 90 m alt., UTM DJ 73, 39.1248°N 20.6568°E, leg. E. & P. Subai 06.08.1975, S 3829/7; on high rocks nearly monuments of Zálongo and on the mountain behind Moni Ágios Dimítrios (= 21.5 km NNW of Préveza), 650–725 m alt., UTM DJ 73, 39.14°N 20.68°E, leg. Gittenberger & Uit de Weerd 15.5.2000, NNM/1; Skafidáki Village near Préveza and at other localities on Skafidáki Peninsula, UTM DJ 81, 38.9877°N 20.7830°E, leg. Pintér, E. & P. Subai 31.07.1976, S 3824/2; 2 km along the highway Ioánina–Árta opposite the rock hole near Ágios Geórgios, 130 m alt., UTM DJ 84, 39.2723°N 20.8446°E, leg. Fauer & Subai 28.09.1989, S 15867/56; on limestone rocks along border of road in Nikolítsi Village, 210 m alt., UTM DJ 85, 39.3037°N 20.7676°E, leg. Subai 15.05.1995, S 15828/4; gorge 5 km N of Térovo (= E of highway Ioánina–Árta), on limestone rocks, 430 m alt., UTM DJ 86, 39.4497°N 20.8790°E, leg. E. & P. Subai 30.07.1975, S 3827/1; bifurcation of the highway Ioánina–Árta to Térovo, on limestone rocks, 285 m alt., UTM DJ 86, 39.4161°N 20.8459°E, leg. Fauer & Subai 28.09.1989, S 15863/1; ruins of the antic amphitheater near Dodoni (= SSW of lake Ioánina), 640 m alt., UTM DJ 87, 39.5461°N 20.7879°E, leg. E. & P. Subai 30.07.1975, S 3832/9; leg. Neuteboom 26.7.1979, NNM/16 + 1 (juv.); Ioánina, UTM DJ 89, 39.66°N 20.84°E, HNHM 40244/1; Kria (= N of Pérama near Ioánina), lime rocks above the upper (= southeastern) cemetery, 610 m alt., UTM DJ 89, 39.7226°N 20.8409°E, leg. Fauer & Subai 27.09.1989, S 15857/49; E border of Amfithea (= Stroúni, E of Pérama), on limestone rocks, 480 m alt., UTM DJ 89, 39.6860°N 20.8727°E, leg. E. & P. Subai 24.07.1975, S 6676/27 + 1 (alk.); leg. Pintér & Subai 30.7.1976, S 3833/2; 2 km E of Amfithea (= Stroúni, E of Pérama), on limestone rocks, 480 m alt., UTM DJ 89, 39.6802°N 20.8871°E, leg. E. & P. Subai 24.07.1975, S 3834/2; NE border of Pérama, on limestone rocks behind the houses, 490 m alt., UTM DJ 89, 39.6986°N 20.8482°E, leg. Fauer & Subai 28.09.1989, S 15862/39; leg. Subai 12.5.1995, S 15845/34; Pérama, on limestone rocks at exit of the stalactite cave, 500 m alt., UTM DJ 89, 39.6949°N 20.8457°E, leg. E. & P. Subai 29.07.1975, S 3823/7, 3835/6; leg. Pintér & Subai 30.7.1976, HNHM 41385/15, 49537/4, S 3825/36; leg. Neuteboom 27.7.1979, NNM/4 + 2 (juv.); leg. Gittenberger & Uit de Weerd 14.5.2000, NNM/3; road between Amótopos and Nisista, UTM DJ 94, 39.27°N 20.97°E, leg. Neuteboom 26.7.1979, NNM/6; Velás monastery (= approx. 2 km S of Kalpáki), on limestone rocks above the spring and in a small cave, 450 m alt., UTM DK 61, 39.8705°N 20.6253°E, leg. Fauer & Subai 27.09.1989, S 15858/2; leg. Subai 16.7.1990, S 15871/4; Kalpáki, UTM DK 61, 39.88°N 20.62°E, leg. Neuteboom 27.7.1979, NNM/1; 1 km NW of Asfáka, UTM DK 70, 39.78°N 20.72°E, leg. Kiss & Pintér 25.7.1986, S 29880/11 + 5 (juv.); Kalpáki–Monodéndri highway, dry lime rocks at road junction to Elafótopos, 860 m alt., UTM DK 71, 39.8753°N 20.6951°E, leg. E. & P. Subai 30.07.1975, S 3826/1; Arísti, UTM DK 72, 39.93°N 20.67°E, leg. Neuteboom 27.7.1979, NNM/1; gorge entrance at bridge across Sarantáporos River between Exohí and Amárantos, dry rock slope, 445 m alt., UTM DK 74, 40.1114°N 20.7218°E, leg. Subai 16.07.1990, S 15869/24; leg. Subai & Szekeres 16.5.1997, S 15846/1; Loutrá (= 5 km

N of Amárantos), W slope of limestone mountain, 1270 m alt., UTM DK 74, 40.1745°N 20.7297°E, leg. Riedel & Subai 12.04.1988, S 15821/1; Loutrá (= N of Amárantos), limestone mountain SW side, 1120 m alt., UTM DK 74, 40.1676°N 20.7321°E, leg. Fauer & Subai 25.09.1989, S 15860/2; mountain E of Loutrá near Amárantos, on N exposed limestone rocks and in forest approx. 500 m SE of Loutra, 1250 m alt., UTM DK 74, 40.1745°N 20.7297°E, leg. Subai & Szekeres 16.05.1997, S 15847/3; Tímfi Mountains, limestone grove after 3h 30' walking E of Pápigó village (= approx. 1–2 km NE of refuge hut), on limestone boulders and under stones, 1650–1700 m alt., UTM DK 82, 39.9961°N 20.7709°E, leg. Subai 24.05.1991, S 15819/5; Tímfi Mountains, near Drakólimni Lake, 2215 m alt., UTM DK 82, 39.98°N 20.77°E, leg. Gittenberger 26.7.1997, NNM/1; 6.6 km from Kónitsa direction Pádes, on limestone rocks in dry mixed forest, 1000 m alt., UTM DK 83, 40.0547°N 20.7898°E, leg. Subai 16.07.1990, S 15870/2; Pádes (= approx. 28 km E of Kónitsa), on limestone rocks at W and N border of the village, 1150–1250 m alt., UTM DK 93, 40.0408°N 20.9054°E, leg. Subai 16.07.1990, S 15868/2; rocks at S border of Agía Paraskeví Village, 995 m alt., UTM DK 94, 40.1438°N 20.8965°E, leg. Fauer & Subai 25.09.1989, S 15859/1; approx. 1 km E of Agía Paraskeví (= in N part of Smólikas Mountains), on rocks beside the highway, 1060 m alt., UTM DK 94, 40.1411°N 20.9069°E, leg. Fauer & Subai 25.09.1989, S 15861/2; 3 km N of Drossopigí, meadow and rocks (no lime) approx. 50 m E of the old arched bridge above the Sarantáporos river, 705 m alt., UTM DK 95, 40.2281°N 20.9133°E, leg. Subai 15.07.1990, S 15873/1 + 1 (juv.); 17.5 km NE von Áрта, an Felsen neben der Landstrasse, 180 m alt., UTM EJ 14, leg. Gittenberger & Uit de Weerd 14.5.2000, NNM/2. — Evritanía, in spruce forest 6.8 km S of Proussós (= direction Agrínio), under stone plates, 1300 m alt., UTM EH 58, 38.7164°N 21.6533°E, leg. Subai 17.05.1991, S 15818/13; bridge at Mégdova river (= Tavropós, 26 km W of Karpeníssi), on limestone rocks, 340 m alt., UTM EJ 51, 38.9415°N 21.6809°E, leg. Fauer & Subai 30.09.1989, S 15854/3; small valley at mountain slope E of Kalesméno (= 16 km W of Karpeníssi), on limestone rocks, 880 m alt., UTM EJ 60, 38.9212°N 21.7281°E, leg. Fauer & Subai 30.09.1989, S 15856/1; 1.5 km N of Vráha, approx. 500 m from Moni Vráha, mountain N and S slope, on limestone rocks, approx. 1100 m alt., UTM EJ 62, 39.0776°N 21.7930°E, leg. Subai & Szekeres 12.05.1997, S 15815/2 + 1(alk.); Kaliakoúda Mountains, Timfristós Mountain (= "Kaljakuda Berge, Veluchi"), UTM n. det., leg. Krüper, 1890, SMF 101913/4, 101914/17, 284854/3. — Etoloakarnanía, UTM n. det., SMF 101936/3; Etoloakarnanía, on the narrow land strip leading to Lefkáda Island, on limestone rocks and on ruins of a small castle, UTM DH 79, 38.8434°N 20.7213°E, leg. E. & P. Subai 06.08.1975, S 3816/4; Vónitsa, UTM DJ 90, 38.92°N 20.88°E, leg. Conéménos, 1890, SMF 284856/2; Veloútsa Mountain SE slope above Astakós, on limestone rocks, approx., 185 m alt., UTM EH 06, 38.5370°N 21.0692°E, leg. Subai, 19.05.1991, S 15817/19; small valley 1 km E of Astakós, on limestone rocks, UTM EH 06, 38.5323°N 21.0998°E, leg. Subai, 19.05.1991, S 15816/10; Lisimáhia (= Murstiana, Mushtiona), UTM EH 26, 38.54°N 21.33°E, leg. Krüper, 1928, SMF 101916/32; Messolóngi, UTM EH 34, 38.36°N 21.42°E, SMF 285671/2; leg. Krüper, 1899, SMF 101915/7, above Kefalóvrissó, on limestone rocks, 30 m alt., UTM EH 35, 38.4598°N 21.3670°E, leg. Fauer & Subai 30.09.1989, S 15855/6; Klisura gorge between Agrínio and Etolikó, on limestone rocks above Ag. Eleusis monastery, 290 m alt., UTM EH 36, 38.5006°N 21.3674°E, leg. Pintér, E. & P.

Subai 31.07.1976, S 3815/3; Berg Varássova (= Karvassara), UTM EH 54, 38.36°N 21.59°E, leg. Conéménos, 1884, SMF 284849/2; Gurica (= Goritza, between Mirtéa and Ágios Nikólaos monastery) at Trihonída Lake (= Lake of Vrachori), UTM EH 57, 38.58°N 21.61°E, leg. Krüper, 1891, SMF 101938/5, 101940/17, 207802/1, 284831/4, 284843/6; N of Amfilohía, on limestone rocks 100–200 m from the bifurcation direction Sardínia, 60 m alt., UTM EJ 10, 38.8833°N 21.1740°E, leg. Fauer & Subai 29.09.1989, S 15865/16; 5.9 km from Empessós direction Perdikáki, on limestone rocks in valley of two lime mountains, approx. 600 m alt., UTM EJ 31, 39.0058°N 21.3606°E, leg. Fauer & Subai 29.09.1989, S 15866/2; 2.5 km E of Halkiópouli, on limestone rocks, 600 m alt., UTM EJ 31, 38.9829°N 21.3700°E, leg. Subai 17.05.1995, S 15839/2; 9.5 km from Halkiópouli direction Tríklino, on limestone rocks, 950 m alt., UTM EJ 31, 38.9666°N 21.3964°E, leg. Fauer & Subai 29.09.1989, S 15864/1; 11.5 km E of Halkiópouli, on small limestone rocks, 750 m alt., UTM EJ 31, 38.9702°N 21.4000°E, leg. Subai 17.05.1995, S 15838/2. Fokída, Strómi Village (= 13.5 km SW of Paúliani), on limestone rocks, 850 m alt., UTM FH 08, 38.7089°N 22.2568°E, leg. Subai 12.04.1986, S 15822/1. — Ahaïa, Pátra (= Patras), UTM EH 63, 38.23°N 21.73°E, SMF 101942/1.

Remarks: According to Cernohorsky (1978: 299), the publication of Anton was issued "around the middle of the year, 1838", but therein, the name *Helix corcyrensis* remained a nomen nudum. Thus, *Helix canalifera* ANTON, 1838 is the first correct and valid description of the *Lindholmiola* species from Corfu. This rarely used name (last mention by Polinski (1924: 130)) is here considered a nomen oblitum. However, Rossmässler (1838: 40, Taf. 39, Fig. 538) validated the name *H. corcyrensis* (ICZN 23.9 cannot be applied), and it was used under his authority in the subsequent literature. The type specimen of Rossmässler is missing in his collection (note of the late Dr Zilch).

In its shell form, *L. corcyrensis* is quite stable, but it varies considerably in size. The populations on the Ionian Islands and the western Epirus are small to medium-sized with a narrower umbilicus and a flat spire (*cefalonica* sensu auct.). In the central parts of Epirus, shells with a broader umbilicus occur. Similarly sized shells, but with an even larger umbilicus and flatter spire are recorded from the Tímfi and Grammos Mountains, where they live at altitudes between 1200–2000 m.

The eastern part of the distribution area of *L. corcyrensis* is inhabited by populations with a strikingly different shell. Here, shells grow larger, with a more elevated spire and a large umbilicus (*octogyrata* sensu auct.). However, in the same area, shells have been recorded, which do not differ from those in the Epirus, and thus, *octogyrata* cannot be considered a separate taxon.

Very small specimens can be found on the island of Lefkáda in Greece and in some places on the eastern shore of Lake Ohrid.

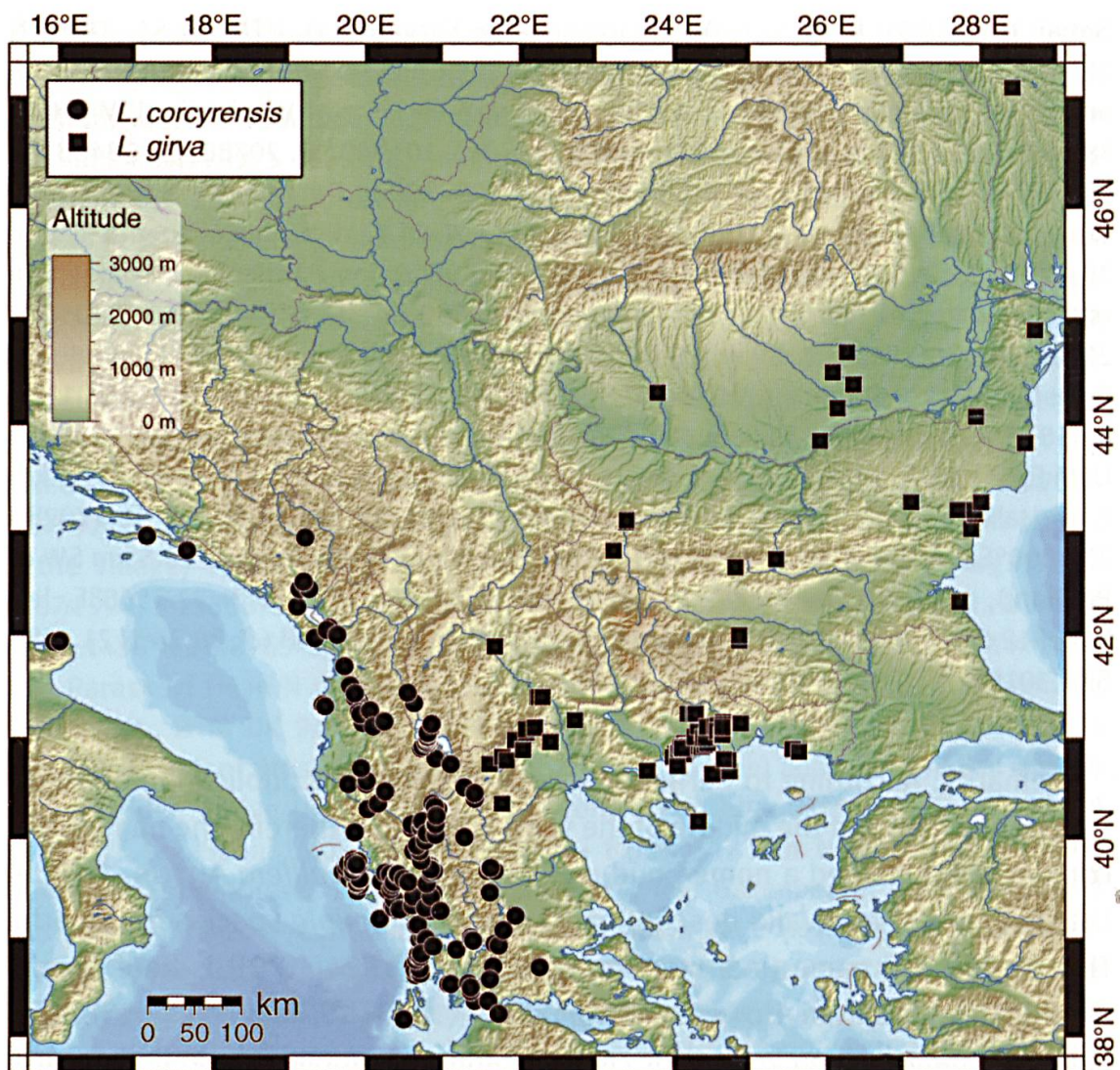


Fig. 29. Distribution of *Lindholmiola corcyrensis* and *L. girva*.

Distribution (Fig. 29): *Lindholmiola corcyrensis* inhabits the south-western Balkan Peninsula. There are two isolated localities known, the Pelješac Peninsula and the Island Badija in Croatia, and the Monte Gargano in Italy. South of the Croatian locality, there is an area of almost 200 km length without any *Lindholmiola* species at all. The main distribution area of *L. corcyrensis* starts in south-eastern Montenegro and covers the whole of Albania and western Greece. In the south, it reaches the island of Kefallinia and the northern shores of the Bay of Korinthos. The southernmost record from close to Pátra in Ahaïa could not be verified by recent collecting efforts. The eastern boundary of its distribution area follows the eastern rim of the Pindos Mountains.

***Lindholmiola girva* (FRIVALDSZKY, 1835)** Figs 14, 29, 30–32, 33–34

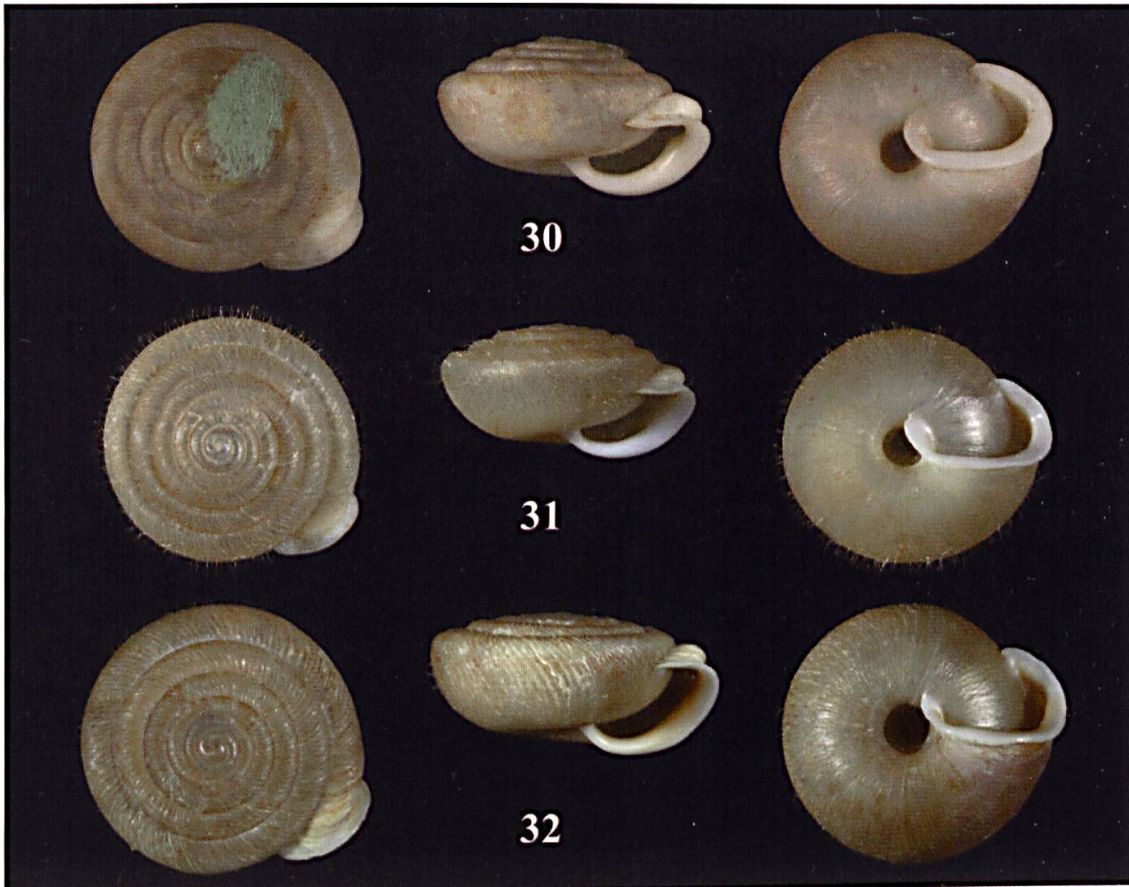
- 1835 *Helix girva* FRIVALDSZKY, A Magyar Tudós Társaság évkönyvei, 2: 274, Taf. 7 Fig. 11.
- 1838 *Helix contorta* var. *minor* ROSSMÄSSLER, Iconographie der Land- & Süßwasser-Mollusken mit vorzüglicher Berücksichtigung der europäischen noch nicht abgebildeten Arten, (1) 2 (1/2): 40, Taf. 39 Fig. 538 b.
- 1848 *Helix corcyrensis* var. β L. PFEIFFER, Monographia heliceorum viventium 1: 415.
- 1859 *Helix corcyrensis* var. *girva*, – Mousson, Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich, 4: 257, 259.
- 1865 *Helix corcyrensis*, – L. Pfeiffer, Malakozoologische Blätter, 12: 103 [non *corcyrensis* ROSSMÄSSLER, 1838].
- 1868 *Helix corcyrensis* var. *minor* – L. Pfeiffer, Monographia heliceorum viventium 5: 415.
- 1887 *Helix (Caracolina) corcyrensis* var. *girva*, – Tryon, Manual of Conchology, 3: 118.
- 1889 *Helix (Caracolina) corcyrensis* var. *girva*, – Westerlund, Fauna, 2: 20.
- 1894 *Helix (Caracollina) corcyrensis* var. *girva*, – Pilsbry, Manual of Conchology, 9: 288.
- 1894 *Helix (Gonostoma) corcyrensis* var. *girva*, – Sturany, Annalen des Kaiserlich-Königlichen Naturhistorischen Hofmuseums, 9: 371.
- 1915 *Helicodonta (Caracollina) contorta girva*, – Sturany & Wagner, Denkschriften der Kaiserlichen Akademie der Wissenschaften in Wien, Mathematisch-Naturwissenschaftliche Klasse, 91: 32, Taf. 2 Fig. 8 a–c.
- 1918 *Caracollina corcyrensis girva*, – Hesse, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 50: 109.
- 1927 *Caracollina contorta girva*, – A. J. Wagner. Annales zoologici Musei Polonici Historiae Naturalis, 6 (4): 364, Taf., 19 Fig. 169.
- 1929 *Caracollina corcyrensis* forma *girva*, – Hesse, Senckenbergiana, 11 (1/2): 96.
- 1936 *Lindholmiola corcyrensis*, – Fuchs & Käufel, Archiv für Naturgeschichte, 5 (4): 651, Fig. 78 (partim, not those of Podgorica) (non *corcyrensis* ROSSMÄSSLER, 1838).
- 1960 *Lindholmiola contorta*, – Urbanski, Bulletin de l'Institut Zoologique de l'Académie Bulgare des Sciences, 9: 92.
- 1971 *Lindholmiola corcyrensis*, – Schileyko, Nauchnykh Dokladi Vyshey Shkoly, Biologicheskie nauki., (Biol. Wiss. Zool.), 12: 12, Fig. 2 B (p.11), Fig. 4, Fig. 5d [non *corcyrensis* ROSSMÄSSLER, 1838].

- 1972 *Lindholmiola (Lindholmiola) corcyrensis*, – Hudec, Annales zoologici Musei Polonici Historiae Naturalis, 29 (10): 337, Abb. 9, Taf. 3 Fig. 7 [non *corcyrensis* ROSSMÄSSLER, 1838].
- 1973 *Lindholmiola (Lindholmiola) corcyrensis girva*, – Hudec & Vašátko, Acta scientiarum naturalium Academiae Scientiarum Bohemoslovacae, 7 (9): 13.
- 1983 *Lindholmiola corcyrensis*, – Reischütz, Annalen des Naturhistorischen Museums in Wien, 85 (B): 135.
- 1978 *Lindholmiola corcyrensis*, – Shileyko, Fauna UDSSR, 3 (6): 116, 118, Fig. 44–45 [non *corcyrensis* ROSSMÄSSLER, 1838].
- 1988 *Lindholmiola corcyrensis corcyrensis*, – Reischütz, Annalen des Naturhistorischen Museums in Wien, 90 (B): 347 [non *corcyrensis* ROSSMÄSSLER, 1838].
- 1988 *Lindholmiola corcyrensis girva*, – Reischütz, Annalen des Naturhistorischen Museums in Wien, 90 (B): 347.

Diagnosis: shell depressed, shell surface covered by granulation, whorls slightly to strongly shouldered, penial lumen with two equally sized pilasters.

Description of shell: shell depressed, spire only slightly raised, shell colour light to chestnut brown; initial half protoconch whorl smooth, then with a dense pattern of few fine radial stripes; the following teleoconch whorls with increasingly stronger stripes, the radial sculpture considerably pronounced on the second and third teleoconch whorls, but often decreasing on the last whorls; radial threads may irregularly vary in height, while on the subsurface of the shell, stripes are usually weak and blurred; the complete shell surface covered by a fine granulation giving the shell a dull appearance; hair warts are missing in general; besides a small, hair-free zone below the suture, shell completely covered by permanent hairs, hairs in the umbilicus usually shorter than those on the rest of the shell; hairs brownish-yellowish, hair length at the shell's shoulder ca 0.4–0.9 mm; $5\frac{3}{4}$ – $7\frac{1}{2}$ regularly increasing, slightly to strongly shouldered whorls, never keeled; last whorl slightly descending before the aperture, then abruptly curving downwards, the down-bent part in a brighter to white colour; suture deep; umbilicus almost cylindrical to slightly perspective, only slightly increasing at the beginning, and the last whorl remaining circular, reaching a diameter of 1.4–2.5 mm; aperture very oblique and strongly bent in lateral view, and ear-like in frontal view, upper part flat; apertural insertion with a distance of 2.3–3.9 mm, connected by a very thin, almost indiscernible callus; peristomial rim sharp, laterally with a strong swelling, basally reinforced, forming a narrow lip (sometimes even with a small tooth); umbilical shield small, covering less than ca 1/10 of the umbilicus.

Measurements: H: 4.2–6.1; D: 8.1–11.7; aH: 3.3–5(1.6–3.4); aW: 3.75–5.8.



Figs 30–32. *Lindholmiola girva*. Fig. 30: syntype *Helix girva* SMF 7047, "Albanien", D = 9.22 mm; Fig. 31: NMBE 515656, Greece, Makedonía, N boundary of Taxiárhis (small rounded form), D = 8.66 mm; Fig. 32: NMBE 515655, Greece, Makedonía, 400 m S of Kehrókambos (broad form, wide umbilicus), D = 9.75 mm. — All photos Neubert/Bochud, × 3.

Details of body (according to 14 animals from 10.5 km N of Vorinó/3, Kéla/2, Taxiárhis/6, and 2.5 km of Paleá Kavála towards Korifés/3): head and dorsum light brown to grey, lateral side of body brighter; sole cream with brownish lateral rims; mantle with a pattern of dispersed, irregularly arranged, dark-grey spots covering the last 1–1½ whorls, often with a broad brown area on the last half of the last whorl; ureter opens 0.5–1.5 mm from the pneumostome.

Morphology of the genital organs (Fig. 14): penis long, slightly enlarged, penial glandular tissue covers ca 1/3–1/6 of the total penis length, penial lumen narrow, with two equally sized pilasters, starting at the distal penial wall and stretching to at least half of the penis length, a third usually shorter and sometimes completely missing pilaster, and sometimes with short perpendicular folds between the pilasters; vagina short, glandula usually of the same length as bursa copulatrix with a scarcely folded part, pedunculus and vesicle of bursa copulatrix not observably differentiated; atrial lumen with a large, broad and flat, serrated pilaster leading towards the vaginal lumen, usually with another narrow fold in parallel.

Differential diagnosis: Large specimens of *L. girva* are quite similar to small shells of *L. lens* (= *lentiformis* sensu auct.), which can be found in Viotía, Fthiótida and on the Island Évvia. This form of *L. lens*, however, differs from *L. girva* by having a blunt peripheral keel, a flatter spire, and continuous acute radial riblets; in lateral view, its aperture is less strongly curved, its upper part not narrowed by the labial callus, as it is found in *L. girva*. In the genital morphology, *L. lens* has a relatively shorter penis, but a longer part of it is covered by the glandular tissue, and the pilasters in its penial lumen are usually shorter.

On average, shells of *L. pirinensis* are larger than those of *L. girva*. In this species, the shell surface is covered with finer and more regularly arranged radial riblets, its hairs are longer but are lost more easily; in lateral view, its aperture is less strongly curved and lipped. In the genital morphology, *L. pirinensis* differs in the form of one of the penial pilasters, which is recurved and points back towards the distal penial wall.

Lindholmiola girva has often been confused with *L. corcyrensis*, which is larger on average. In this species, the teleoconch whorls are more rounded with a blunt periphery. The radial riblets are more irregularly arranged, and the last whorl is broader. The umbilicus is oval in both species, but in *L. corcyrensis*, it is more eccentric. Both species can easily be separated by the form of their penial pilasters, which consist of small v-shaped folds in *L. corcyrensis* instead of the longitudinal pilasters in *L. girva*.

Type specimens: "Albanien", UTM n. det., syntype *girva*: SMF 7047/1; "...a "Balkány" hegyeinek aljasabb domboldalaiban" (see remarks).

Additional specimens examined:

Moldavia, Kodry (= Codrii, Chodrii) rezervat (= 30 km WNW of Chişinău), UTM PN 01, 47.08°N 28.42°E, leg. Mészáros 14–20.7.1986, HHNM 23876/1.

Romania, Craiova, UTM GQ 20, 44.30°N 23.80°E, leg. Knorr, 1940, SMF 279320/2; Slobozia (= Slobosia), UTM MJ 15, 43.85°N 25.91°E, leg. Wohlberedt, 1903, SMF 101903/3; Bucureşti–Băneasa, UTM MJ 27, 44.49°N 26.08°E, leg. Grossu, 18.5.1964, SMF 227417/5; Comana (= near Bucureşti), UTM MJ 39, 44.16°N 26.14°E, leg. Wohlberedt, 1903, SMF 101902/3; Kuznetzov 11.1985, Maa/2; Bucureşti (= Bukarest), UTM n. det., SMF 101904/3, 284877/4; Fundeni (= Fundiaeni), UTM MK 41, 44.38°N 26.35°E, leg. Goldfuß, 1884, SMF 284862/1; Căldărusani monastery (= Caldarouchani), UTM MK 44, 44.6761°N 26.2665°E, leg. Licherdopol, 1901, SMF 101925/4; Adamclisi (= Adamklissi), UTM NJ 78, 44.08°N 27.94°E, leg. Martens 2.7.1918, SMF 284835/1; Mangalia, UTM PJ 25, 43.83°N 28.58°E, leg. Montandon, 1902, SMF 101924/4; forest S of Babadag, UTM PK 37, 44.88°N 28.71°E, 7.6.1938, SMF 207889/2.

Fyrom, Katlanovo, UTM EM 53, 41.89°N 21.68°E, leg. Maassen 7.1980, Maa/3; leg. Kiss & Pintér 4.7.1985, HHNM 30857/5 (+ 1 *pirinensis*); Demir Kapija, UTM

FL 08, 41.40°N 22.23°E, leg. Brankovics 2.5.1973, HNHM 49541/5; leg. Kiss & Pintér 4.7.1986, HNHM 29884/1 (juv.); Demir Kapija, banks of Vardar River, UTM FL 08, 41.40°N 22.25°E, leg. Mikuska & Sipos 28–30.9.1975, HNHM 49538/3 + 1 (juv.), 49539/9 + 3 (juv.); gorge 3.5 km from Demir Kapija direction Gevgelija, banks of Vardar River, on limestone rocks, UTM FL 08, 41.40°N 22.30°E, leg. Maassen 7.1980, Maa/24 + 2 (juv.); leg. Subai 28.7.1990, S 15637/7; Stari Dojran, church ruins, UTM FL 46, 41.17°N 22.72°E, leg. Neuteboom 15.7.1976, NNM/19.

Bulgaria, Kostinbrod near Sofija, UTM FN 84, 42.81°N 23.22°E, leg. Mészáros 9.1981, HNHM 13871/1 (juv.) (+ 1 *pirinensis*); [Gara] Lakatnik, UTM FN 97, 43.08°N 23.38°E, leg. Pintér 5.8.1981, HNHM 33702/3 + 2 (juv.); 2.5 km from [Gara] Lakatnik towards Milanovo, UTM FN 97, 43.10°N 23.39°E, leg. Kiss & Pintér 15.7.1984, HNHM 37469/1 (juv.); between Bačkovo and Dobrostan [Mountain], UTM LG 24, 41.95°N 24.86°E, leg. Pintér 17.7.1970, HNHM 33700/1 (juv.); Asenovgrad, UTM LG 25, 42.00°N 24.86°E, leg. Pintér 25.7.1967, SMF, 198754/1; Karlovo, UTM LH 22, 42.65°N 24.81°E, leg. Pintér 28.7.1967, HNHM 33697/1 + 1 (juv.); Šipka Pass, UTM LH 63, 42.73°N 25.34°E, leg. Pintér 13.7.1973, HNHM 49536/1; Ropotamo Bank, Arkutino Camping, sand dune, UTM NG 67, 42.32°N 27.73°E, leg. Szigethy 4.7.1973, HNHM 49550/1; Madara bei Šumen, UTM NH 09, 43.27°N 27.10°E, leg. Kroupa 6.8.1978, SMF 254021/14; N border of Beloslav (= W of Varna), UTM NH 58, 43.20°N 27.70°E, leg. Pintér, 19.7.1968, HNHM 33698/61 + 13 (juv.); Kamcija (= S of Varna), UTM NH 76, 43.02°N 27.88°E, leg. Pintér 16.7.1968, HNHM 33695/8 + 5 (juv.); Galata (= S of Varna), UTM NH 77, 43.16°N 27.93°E, 1936, SMF 101927/2; Varna, UTM NH 78, SMF 284872/2; leg. Urbanski 8.1936, SMF 158897/8; Varna, coast, UTM NH 78, 43.20°N 27.92°E, leg. Balogh 20.6.1956, HNHM 33701/2; Aladža monastery (= N of Varna), UTM NH 89, 43.27°N 28.01°E, leg. Podani 9.8.1980, HNHM 11641/1.

Greece, Makedonía, in dry valley at NW border of Kéla, on limestone rocks, 820 m alt., UTM EL 51, 40.3482°N 21.7730°E, leg. Subai & Szekeres, 19.05.1997, S 15677/3 + 3 (alk.); 2 km S of Vévi (= 17.5 km ESE of Flórina), 900 m alt., UTM EL 51, 40.74°N 21.61°E, leg. Gittenberger & Uit de Weerd 10.5.2000, NNM/1; rocks 11 roadkm. of Kéla (= 24 km W of Édessa), 650 m alt., UTM EL 61, 40.81°N 21.78°E, leg. Gittenberger & Uit de Weerd 11.5.2000, NNM/6; 1.5 km S of Árnissa, on dry limestone rocks, 520 m alt., UTM EL 71, 40.7775°N 21.8352°E, leg. Subai 09.05.1995, S 15648/15 + 1 (alk.); in valley behind Loutráki village, on marble rocks, 350 m alt., UTM EL 73, 40.9769°N 21.9454°E, leg. Subai & Szekeres, 19.05.1997, S15676/25; 8 km N of Édessa (= Édessa–Ápsalos country road), 3.8 roadkm. N of Sotíra, on rocks at S rim of the road, 180 m alt., UTM EL 82, 40.88°N 22.05°E, leg. Gittenberger & Uit de Weerd 10.5.2000, NNM/2; gorge 2 km N of Neohóri (= NE of Aridéa), on limestone rocks, 250 m alt., UTM EL 94, 41.0475°N 22.0916°E, leg. Subai 09.05.1995, S 15649/1; valley 10.5 km N of Vorinó (= direction Pefkotó) and 1 km walking path to limestone rocks, 850 m alt., UTM EL 94, 41.0846°N 22.0849°E, leg. Subai & Szekeres, 19.05.1997, S 15675/21 + 3 (alk.); above Nótia, on dry limestone rocks, 650 m alt., UTM FL 05, 41.1072°N 22.2115°E, leg. Subai 09.05.1995, S 15650/6; on limestone rocks 200 m N of Nótia, 600 m alt., UTM FL 05, 41.10°N 22.20°E, leg. Gittenberger & Uit de Weerd 10.5.2000, NNM/3; gorge at N border of Gríva, on limestone rocks, 480 m alt., UTM FL 13, 40.9574°N 22.4055°E, leg. Subai 09.05.1995, S 15647/12; 500 m W of Gríva (= WSW of Axioúpoli), on limestone rocks, 540 m alt., UTM FL 13, 40.9562°N 22.4009°E,

leg. Subai & Szekeres 20.05.1997, S 15683/4 + 1 (alk.); bifurcation of highway Rendi-na–Asproválta to Stavρός, on crystalline rocks, 15 m alt., UTM GL 20, 40.6728°N 23.6633°E, leg. Subai 28.05.1997, S 15660/2; mountain slope N of Podohóri, on limestone rocks, 450 m alt., UTM KF 42, 40.8473°N 24.0249°E, leg. Subai 27.05.1997, S 15672/15 + 3 (juv.); Mesorópi (= W of Kavála), UTM KF 52, 40.86°N 24.08°E, leg. Maassen 7.1980, Maa/1; Kokkinohóri, UTM KF 52, 40.81°N 24.00°E, leg. Neuteboom 11.7.1976, NNM/2 (juv., alk.); on rocks E of Platantopos (= "Platanohóri" ?), UTM KF 52, 40.84°N 24.06°E, leg. Neuteboom 11.7.1976, NNM/6; E border of Mousthéni, on low limestone rocks, 175 m alt., UTM KF 52, 40.8566°N 24.1137°E, leg. Subai 06.05.1995, S 15658/7 + 3 (alk.); on marble rocks 1 km from Platanótopos direction Eleftheroupoli (= 4.7 km NE of Podohóri), 280 m alt., UTM KF 52, 40.8524°N 24.0717°E, leg. Subai 27.05.1997, S 15671/3; Simvoló Mountains, 1.2 km from Sidirohóri direction Foliá (= W of Karavangélis), on limestone rocks, 250 m alt., UTM KF 52, 40.8380°N 24.1375°E, leg. Subai 27.05.1997, S 15670/2; 1 km NE of Akrovouni, 180 m alt., UTM KF 52, 40.90°N 24.21°E, leg. Gittenberger & Uit de Weerd, 18.5.1999, NNM/3; small gorge at S border of Nikíssiani, 350 m alt., UTM KF 53, 40.9467°N 24.1439°E, leg. Fauer & Subai 22.09.1989, S 15656/1; beech forest 7.5 km from Akrovouni direction Pangéo peak, in leaf litter and under stones, 480 m alt., UTM KF 53, 40.9237°N 24.2178°E, leg. Subai 27.05.1997, S 15669/4 + 1 (juv.) + 2 (alk.); river valley 8 km from Akrovouni direction Pangéo peak, in forest, on limestone rocks, 600 m alt., UTM KF 53, 40.9210°N 24.2060°E, leg. Fauer & Subai 23.09.1989, S 15641/6; oak forest 11.6 km from Akrovouni direction Pangéo peak, on limestone rocks, 900 m alt., UTM KF 53, 40.9171°N 24.1906°E, leg. Fauer & Subai 23.09.1989, S 15642/2; river valley 12.3 km from Akrovouni direction Pangéo peak, on limestone rocks, 950 m alt., UTM KF 53, 40.9222°N 24.1876°E, leg. Fauer & Subai 23.09.1989, S 15643/2; 17.8 km from Akrovouni direction Pangéo peak, on NW exposed limestone rocks, 1280 m alt., UTM KF 53, 40.9147°N 24.1465°E, leg. Fauer & Subai 23.09.1989, S 15644/2; 22.7 km from Akrovouni direction Pangéo peak, on limestone rocks, 1600 m alt., UTM KF 53, 40.9079°N 24.1176°E, leg. Fauer & Subai 23.09.1989, S 15645/1; 25.2 km from Akrovouni direction Pangéo peak, meadow with limestone rocks below the peak, 1780 m alt., UTM KF 53, 40.9113°N 24.0973°E, leg. Fauer & Subai 23.09.1989, S 15646/2; 2.5 km of Pangéo peak, 1650 m alt., UTM KF 53, 40.91°N 24.10°E, leg. Gittenberger & Uit de Weerd, 18.5.1999, NNM/1; 4.5 km of Pangéo peak, 1400 m alt., UTM KF 53, 40.90°N 24.12°E, leg. Gittenberger & Uit de Weerd, 18.5.1999, NNM/2; mountain slope 4.5 km W of the bifurcation to Loutrá Eleftheró (= 48 km W of Kavála), on limestone rocks, 30 m alt., UTM KF 51, 40.7211°N 24.0601°E, leg. Fauer & Subai 21.09.1989, S 15659/22; N border of Taxiárhis, under crystalline stones, 500 m alt., UTM KF 66, 41.2328°N 24.1888°E, leg. Subai 22.05.1997, S 15679/5 + 8 (alk.); Batis, UTM KF 73, 40.91°N 24.37°E, leg. Neuteboom 12.7.1976, NNM/1; ruin field of Philippi near Krínides, UTM KF 74, 41.01°N 24.28°E, leg. Neuteboom 12.7.1976, NNM/1 (juv.); leg. Maassen 7.1980, Maa/9 + 2 + 3 (juv.); leg. Kiss & Pintér 7.7.1986, HNHM 29882/2; 5 km from Limnia direction Zigós, on low limestone rocks and under stones, 730 m alt., KF 74, 41.0589°N 24.3816°E, leg. Subai 26.05.1997, S 15667/1; 1 km W of Peristéria (= direction Adriani), on limestone rocks, approx. 400 m alt., UTM KF 75, 41.1177°N 24.3837°E, leg. Subai 23.05.1997, S 15673/2; 1.3 km from Agorá direction Peristéria, on limestone rocks, approx. 380 m

alt., UTM KF 75, 41.1165°N 24.3244°E, leg. Subai 23.05.1997, S 15674/1; 1 km E of Nikifóros, UTM KF 76, 40.17°N 24.33°E, leg. Kiss & Pintér 5.7.1986, HNHM 29886/1; in Makriplágio Village, beech forest and border of forest with stone walls, under stones and in leaf litter, on crystalline rocks, 880 m alt., UTM KF 76, 41.2267°N 24.2713°E, leg. Subai 22.05.1997, S 15680/11; beech forest 3.2 km N of Makriplágio (along the highway), under stones, in leaf litter, crystalline rocks, 900 m alt., UTM KF 76, 41.2350°N 24.2945°E, leg. Subai 22.05.1997, S 15678/1 + 1 (juv.) + 1 (alk.); Kavála, citadel, UTM KF 83, 40.93°N 24.41°E, leg. Maassen 7.1980, Maa/7 + 1 (juv.); 2 km E of Kavála, UTM KF 83, 40.95°N 24.45°E, leg. Maassen 7.1980, Maa/1; 2.5 km from Paleá Kavála direction Korifés, on low limestone rocks and under stones, 500 m alt., UTM KF 84, 41.0170°N 24.4388°E, leg. Subai 07.05.1995, S 15651/15 + 3 (alk.); 3 km W of Paleá Kavála, on limestone rocks above the river, 200 m alt., UTM KF 84, 41.0009°N 24.3934°E, leg. Subai 07.05.1995, S 15654/1; 4.2 km from Paleá Kavála direction Halkeró, S exposed mountain slope, on limestone rocks, 440 m alt., UTM KF 84, 40.9994°N 24.4273°E, leg. Subai 26.05.1997, S 15664/1; on limestone rocks at SE border of Likóstomo, 740 m alt., UTM KF 85, 41.1078°N 24.4424°E, leg. Subai 26.05.1997, S 15668/7; 4 km from Platamónas direction Lekáni, 720 m alt., UTM KF 95, 41.1149°N 24.5478°E, leg. Subai 07.05.1995, S 15655/4 + 3 (alk.); 800 m W of Dipótamos, on limestone rocks beside highway, 690 m alt., UTM KF 95, 41.1196°N 24.5762°E, leg. Subai 26.05.1997, S 15663/8; on low marble rocks at Disvato Village, under stones and in leaf litter, 450 m alt., UTM KF 95, 41.0681°N 24.5713°E, leg. Subai 26.05.1997, S 15665/5 + 1 (juv.); stone hedge in valley of two mountains 1 km from Ágios Kosmás direction Makrihóri, 380 m alt., UTM LF 04, 41.0783°N 24.6536°E, leg. Subai 26.05.1997, S 15662/1; 1 km N of Zarkadia (= 1.3 km along the road), UTM LF 04, 41.02°N 24.63°E, leg. Gittenberger 29.5.1999, NNM/2; limestone mountain approx. 2.5 km NNE of Zarkadía (along the road), 450 m alt., UTM LF 04, 41.0288°N 24.6417°E, leg. Kiss & Pintér 7.7.1986, HNHM 29885/6 + 2 (juv.); leg. Fauer & Subai 22.9.1989, S 15657/2; Subai 7.5.1995, S 15653/4; 400 m S of Kehrókambos, under (lime) stones, 390 m alt., UTM LF 05, 41.1514°N 24.6454°E, leg. Subai 07.05.1995, S 15652/3; small river gorge 4.1 km from Kehrókambos direction Makrihóri, stone hedge, under stones, 485 m alt., UTM LF 05, 41.1292°N 24.6448°E, leg. Subai 26.05.1997, S 15666/1; 7.2 km from Kehrókambos direction Makrihóri, at crossing to Skopós, under stones, 550 m alt., UTM LF 05, 41.1043°N 24.6392°E, leg. Subai 26.05.1997, S 15661/1. — Thráki, gorge at N border of Xánthi, UTM LF 25, 41.14°N 24.88°E, leg. Maassen 7.1980, Maa/2; surroundings of the cave of Marónia (= NW of Marónia), UTM LF 73, 40.8900°N 25.5560°E, leg. Subai 25.07.1990, S 15639/13; mountain at sea shore 6.8 km W of Díkella, on limestone rocks, approx. 30 m alt., UTM LF 82, 40.8631°N 25.6399°E, leg. Subai 26.07.1990, S 15640/1. — Thássos Island, N of Skála Marió, UTM KF 90, 40.64°N 24.51°E, leg. Kiss & Pintér 6.7.1986, HNHM 29881/4 + 1 (juv.); narrow (partim) of a valley 2.8 km NE of Theológos, on marble rocks, 530 m alt., UTM LF 00, 40.6696°N 24.7329°E, leg. Subai 25.07.1990, S 15932/1; Thássos Liménas, amphitheater, UTM LF 01, 40.7818°N 24.7174°E, leg. Neuteboom 13.7.1976, NNM/4 (alk.); between Thássos Liménas and Pahí (= 5 km W of Thássos Liménas), UTM LF 01, 40.787°N 24.66°E, leg. Neuteboom 13.7.1976, NNM/1.

Erroneous or imprecise localities: "Albanien" UTM n. id., 284847/2, 284869/1; "Rumälien" UTM n. id., HNHM 49547/1+1 (juv.), SMF 284868/3.

Remarks: According to Frivaldszky (1835: 274), this species was collected "at low hill slopes in the mountains of the Balkan". In his introduction Frivaldszky explains that the specimens were collected by colleagues from the surroundings of "Szlivno" (= Sliven, Bulgaria). Today, there is only a single specimen left from the collections of Frivaldszky, i.e. SMF 7047/1 (in coll. Rossmässler), which is here considered a syntype. This specimen is small, rounded, and has a weak denticle on the upper part of the lip. The label states "Albanien", but according to Zilch (pers. comm.), this label was written by Kobelt. Three other specimens in SMF (SMF 284847/2 and 284869/1) are also said to originate from Albania but stem from Stenz, and thus do not represent type material.

Lindholmiola girva shows only a small degree of shell variability. There are two forms, which occur in parallel in many populations and are always connected by intergrading specimens. The first form has rounded small shells with a narrow umbilicus, while the other form is more flattened with a slightly larger umbilicus.

Distribution (Fig 29): *Lindholmiola girva* can be found in quite a large area in the northeastern Balkan Peninsula. It can be found in southern Moldavia, southern and southeastern Rumania and it is widespread in Bulgaria and northern Greece. It has also been recorded from the valley of the Vardar in Fyrom.

***Lindholmiola gyria* (ROTH, 1839) Figs 33–34, 35, 44**

1839 *Helix gyria* ROTH, Molluscorum species, quas in itinere per Orientem factis comites clariss. Schubert doctores M. Erdl et J. R. Roth collegerunt: 16, Taf. 1 Fig. 17–18.

1846 *Helix gyria*, – L. Pfeiffer, in: Martini & Chemnitz: Systematisches Conchylien-Cabinet, 1. 12 (II): 283, Taf. 124 Fig. 31–33.

1848 *Helix gyria*, – L. Pfeiffer, Monographia heliceorum viventium, 1: 414.

1853 *Helix gyria*, – L. Pfeiffer, Monographia heliceorum viventium, 3: 261.

1868 *Helix gyria*, – L. Pfeiffer, Monographia heliceorum viventium, 4: 312.

1859 *Helix gyria*, – Mousson, Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich, 4: 259.

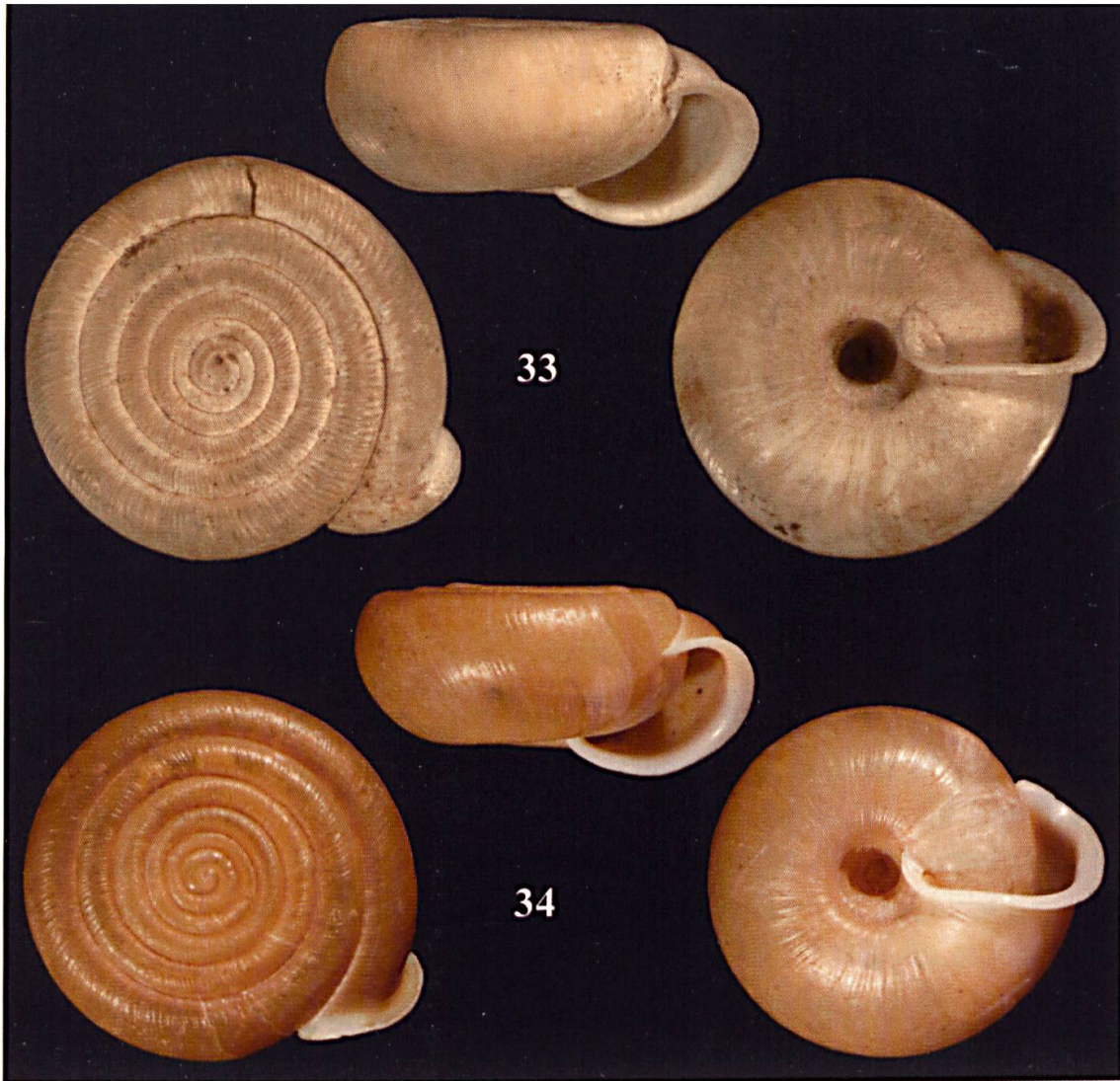
1868 *Helix gyria*, – L. Pfeiffer, Monographia heliceorum viventium, 5: 415.

1876 *Helix gyria*, – L. Pfeiffer, Monographia heliceorum viventium, 7: 466.

1887 *Helix gyria*, – Tryon, Manual of Conchology, 3: 177.

1889 *Helix (Caracolina) gyria*, – Westerlund, Fauna, 2: 20.

1894 *Helix (Caracollina) gyria*, – Pilsbry, in Tryon, Manual of Conchology, 9: 228.



Figs 33–34. *Lindholmiola gyria*. Fig. 33: syntype *Helix gyria*, ZSM 1781, Turkey, "Cacamo Cariae", D = 14.9 mm; Fig. 34: NMBE 515613, Turkey, Vilayet Antalya, Phaselis, ruins close to Tekirova, D = 13.68 mm. — All photos Neubert/Bochud, × 3.

1898 *Helix (Gonostoma) gyria*, – Kobelt, in Rossmässler, E. A.: Iconographie der Land- & Süßwasser-Mollusken mit vorzüglicher Berücksichtigung der europäischen noch nicht abgebildeten Arten, (2) 8 (1/4): 53, Taf. 226 Fig. 1447.

1918 *Caracollina gyria*, – Hesse, Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft, 50: 109.

1991 *Helicodonta gyria gyria*, – Maassen, Basteria 55: 123, Fig. 1–3.

Diagnosis: shell strongly depressed, protoconch and first teleoconch whorls slightly immersed, whorls densely coiled, extremely long bursa copulatrix.

Description of shell: shell strongly depressed, protoconch and first teleoconch whorls slightly immersed, basic shell colour brown; initial part of protoconch whorls smooth, followed by 1–1¼ whorls with a pattern of a few fine

radial stripes; the following teleoconch whorls with increasingly stronger radial stripes, but almost lacking on the last whorls; surface of the last whorl covered by a fine granulation; sometimes with hairs, hair warts can be found in the granulated surface sculpture; $6\frac{1}{4}$ – $7\frac{1}{4}$, densely coiled and well rounded whorls, last whorl slightly descending before the aperture; suture deep; umbilicus broad, almost cylindrical, reaching a diameter of 2.8–3.3 mm; aperture oblique, slightly bent in lateral view, and strongly ear-like in frontal view; apertural insertion with a distance of 4.2–5.3 mm, connected by a very thin, almost indiscernible callus; peristomial rim \pm sharp, laterally with a strong swelling, basally reinforced with a small umbilical shield.

Measurements: H: 5.3–6.4; D: 12.3–15; aH: 4.4–5.5 (5.6–6.6); aW: 5.8–6.9.

Details of body (after one specimen from Phaselis): head and dorsum dark grey, flanks and tail light grey; sole cream with a greyish rim; mantle collar translucent with grey spots of pigment; secondary ureter opens 1.5 mm apart from the respiratory pore.

Morphology of the genital organs (Fig. 44): penis relatively long, slightly enlarged in its central part, penial glandular tissue covering ca 1/4 of the total penis length, penial lumen filled by a single, broad and serrated pilaster, starting at the distal penial wall and stretching to the narrow penial pore, where it recurves and ends centrally in the penis, remaining penial lumen with short perpendicular folds; vagina relatively long, filled with a long, narrow pilaster connecting to one of the atrial pilasters, glandula with a short stalk and a strongly folded part, bursa copulatrix three times the length of the glandula, bursa copulatrix narrow, same length as glandula, pedunculus reaching ca 40% of the total length of the bursa copulatrix, vesicle of bursa copulatrix elongate, double the diameter of the pedunculus; atrial lumen with several broad and short interdigitating pilasters.

Differential diagnosis: The shell of *L. gyria* with its broad last whorl and the slightly concave spire resembles that of *Helicodonta obvoluta*, and thus cannot be confused with any of the other species of the genus *Lindholmiola*. The extremely long bursa copulatrix differentiates it from all its congeners.

Type specimens: Turkey, Antalya County, Kekova Island, "Cacamo Cariae", 36.17°N 29.87°E, syntype *gyria*: ZSM 1781.

Additional specimens examined:

Turkey, Antalya County, Kekova Island (= Cacamo Cariae, 20 km E of Kaş), UTM QA 50/60, 36.17°N 29.87°E, (Roth, 1839: 16, Maassen, 1991: 124); rocks NW of lake near Beymelek (= 9 km as the crow flies WSW of Finike), UTM TF 31, 36.2726°N 30.0456°E, leg. Welter-Schultes 27.9.1998, coll. Welter-Schultes/1; Karamanbeyli pass near Finike (= Phinika Pass), UTM TF 43, 36.54°N 29.98°E, SMF 284853/1; forest in gorge of

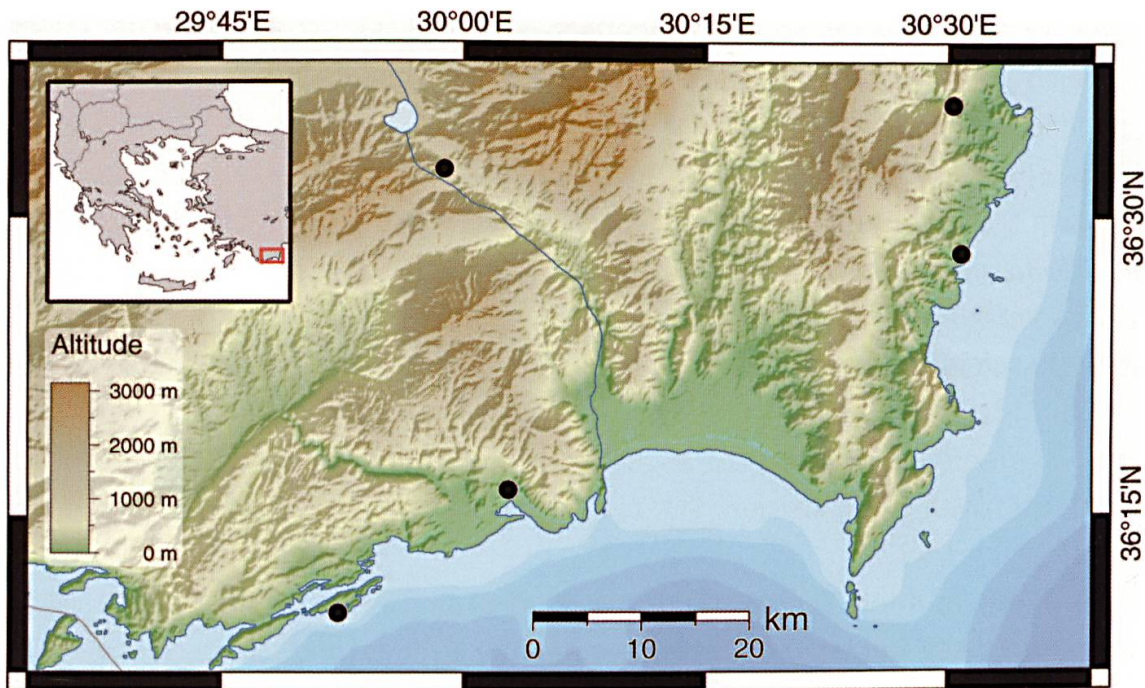


Fig. 35. Distribution of *Lindholmiola gyria*.

Kemer creek (= W of Kemer), UTM TF 75, 36.5943°N 30.5049°E, (Maassen, 1991: 124); Phaselis, ruins near Tekirova (= 10 km S of Kemer), UTM TF 84, 36.4704°N 30.5131°E, (Maassen, 1991: 124); leg. Subai 26.2.1999, S 16083/17 + 7 (juv.) + 1 (alk.).

Remarks: This species is probably endangered, because even empty shells are very rare. In February 1999, it took several hours until the only hitherto known living specimen could be found close to Phaselis. The anatomical investigation revealed that it belongs to *Lindholmiola* and not to *Helicodonta*. In 1991 (p. 124, Fig. 4–6), Maassen described *Helicodonta gyria wilhelminae* from Crete, which is considered an endemic *Helicodonta* species.

Distribution (Fig 35): This species is only known from a small coastal stripe in the south-western part of the vilayet Antalya. The distribution range covers the Island Kekova (= E of Kaş) and the surroundings of Kemer to Phaselis.

***Lindholmiola pirinensis* JAECKEL, 1954** Figs 26, 36–38, 39

1954 *Lindholmiola contorta pirinensis* JAECKEL, Mitteilungen aus dem Zoologischen Museum in Berlin, 30 (1): 86, Abb. 22.

1957 *Lindholmiola corcyrensis pirinensis*, – Jaekel, Klemm & Meise, Abhandlungen und Berichte aus dem Staatlichen Museum für Tierkunde in Dresden, 23 (2): 188.

- 1962 *Lindholmiola corcyrensis pirinensis*, – Klemm, Sitzungsberichte der Österreichischen Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse, Abt. I, 171 (6/7): 253.
- 1968 *Lindholmiola corcyrensis*, – L. Pintér, Malakologische Abhandlungen aus dem Staatlichen Museum für Tierkunde Dresden, 2 (15): 226, Abb. 4, Abb. 32–34 [non *corcyrensis* ROSSMÄSSLER].
- 1973 *Lindholmiola (Lindholmiola) corcyrensis pirinensis*, – Hudec & Vašátko, Acta scientiarum naturalium Academiae Scientiarum Bohemoslovacae, 7 (9): 13, Abb. 10 right side Taf. 3 Fig. 1.
- 1988 *Lindholmiola corcyrensis pirinensis*, – Reischütz, Annalen des Naturhistorischen Museums in Wien, 90 (B): 347.

Diagnosis: shell depressed, usually no granulation, whorls with a blunt shoulder, distal penial lumen with two equally sized strong pilasters.

Description of shell: shell depressed, with a slightly raised spire, basic colour light to chestnut brown; initial half of the protoconch whorl smooth, then with a very fine and dense radial sculpture; teleoconch surface with strong radial riblets, becoming very weak on the penultimate and ultimate whorl, a granulation usually lacking; yellowish hairs usually eroded (length 0.47–1.4 mm, shorter in the umbilicus), but if present covering the whole shell except a small, hair-free zone around the shells periphery, where only randomly some small hair knuckles can be found; shell with $5\frac{1}{4}$ – $6\frac{3}{4}$ regularly increasing and well rounded whorls, with a blunt shoulder, last whorl descending shortly before the aperture; suture of medium depth; umbilicus almost cylindrical at its beginning, suddenly increasing in size in the last whorl, diameter 1.55–2.8 mm; aperture oblique, slightly curved in lateral view; in frontal view obliquely oval, peristomial insertions with a gap of 2.65–5.9 mm; parietal callus very thin, often missing; peristome sharp, strongly broadened laterally, slightly reflected basally; oblique columellar reflection, but only covering ca 1/10 of its diameter.

Measurements: H: 4.7–7.5; D: 9.2–16.4; aH: 4.2–7.5(2.65–5); aW: 4.5–8.

Details of body (according to 10 specimens (3 km from the crossing Vólakas/6; 3.2 km N of Makriplágio/4; Hudec & Vašátko, 1973: 13, Abb. 10): head and neck greyish to brown-greyish, flanks and tail cream; sole cream with darker rims; mantle rim with a 1 mm broad stripe without pigmentation, rest of mantle for $1\frac{1}{2}$ whorl with a pattern of large grey to brown spots, subsuturally with a broad brown stripe; secondary ureter opens 1 mm before pneumostome, split into two 1 to 1.5 mm long canals.

Morphology of the genital organs (Fig. 26): penis relatively long, slightly to well thickened, penial glandular tissue covers ca 1/3 of the total penis length,



Figs 36–38. *Lindholmiola pirinensis*. Fig. 36: holotype *Lindholmiola contorta pirinensis*, ZMB 101257, Bulgaria, Banderica Valley, D = 14.2 mm; Fig. 37: NMBE 515637, Greece, Thráki, Canyon 2 km N of Xánthi (flat form with wide umbilicus, arid areas), D = 10.8 mm; Fig. 38: NMBE 515638, Greece, Makedonía, beech forest 3.2 km N Makriplágio (large form of wooded areas), D = 14.5 mm. — All photos Neubert/Bochud, × 3.

distal penial lumen with two equally sized strong pilasters, one of them with proximal warts and a rounded, thickened distal end, the other pilaster is in parallel, but recurving and leading back to unite with the warty end of the first pilaster; vagina short to relatively long, lumen filled with a long and thick pilaster which splits distally into two branches (sometimes with additional

parallel folds); glandula with a long stalk and a strongly folded part, bursa copulatrix as long as or sometimes longer than the glandula, pedunculus constituting ca half of the total length of the bursa copulatrix, vesicle of bursa copulatrix not observably differentiated; atrial lumen with a large serrated area, and with a central pilaster that connects to the vaginal pilaster.

Differential diagnosis: In its general habit, *L. pirinensis* is quite close to *L. corcyrensis*, but it differs from this species by its well rounded whorls and the deeper suture. In *L. corcyrensis*, the teleoconch surface sculpture is coarser, with stronger irregular radial stripes. The hairs are usually permanent in *L. pirinensis*, but on average shorter. The descending part of the last whorl is bright to almost whitish, and the apertural rim usually more strongly reinforced with a small columellar shield. The penial pilasters are v-shaped wrinkles but longitudinal pilasters in *L. pirinensis*.

On average, shells of *L. girva* are smaller than those of *L. pirinensis*, with the first species having a coarser teleoconch surface sculpture, with stronger irregular radial stripes. The hairs in *L. pirinensis* are usually permanent but shorter than those of *L. girva*. In *L. pirinensis*, the descending part of the last whorl is bright to almost whitish, and the apertural rim usually more strongly reinforced. In *L. girva*, the penial pilasters never recurve like in *L. pirinensis*.

Type specimens: Bulgaria, Pirin Mountains, Banderica Valley, 1800–2000 m alt., UTM GM 02, 41.76°N 23.41°E, leg. Rensch, holotype *pirinensis*: ZMB 101257, paratype *pirinensis*: ZMB 101258/5 + 2 (juv.); ex Knipper, ex coll. Jaeckel, paratype *pirinensis*: SMF 153359/2.

Additional specimens examined:

Fyrom, Katlanovo, UTM EM 53, 41.89°N 21.68°E, leg. Kiss & Pintér 4.7.1985, HNHM 30857/1 (+ 5 *girva*).

Bulgaria, Kostinbrod near Sofija, UTM FN 84, 42.81°N 23.22°E, leg. Mészáros 9.1981, HNHM 13871/1 (+ 1 juv. *girva*); [Gara] Lakatnik, UTM FN 97, 43.08°N 23.38°E, leg. Pintér 13.7.1967, HNHM 33699/38 + 2 (juv.); leg. Erőss 24.8.1976, S, 18264/1; between Belogradčik and Orešec, UTM FP 33, 43.65°N 22.70°E, leg. Kiss & Pintér, 18.7.1984, HNHM 37470/1; Pirin Mountains, Banderica Valley, near Banderica hut, UTM GM 02, 41.78°N 23.44°E, leg. Clauß, Maa/2; leg. Pintér 14.7.1974, HNHM 49535/1; Plovdiv (= Philippopel), hill "Schacht Tepe", UTM n. det., leg. Matscheva, SMF 284839/3; surroundings of Bačkovski monastery, UTM LG 24, 41.9426°N 24.8491°E, leg. Pintér 22.7.1967, S 3839/3; leg. Pintér 10.7.1973, HNHM 49546/1 + 3 (juv.); leg. Pintér 13.8.1981, HNHM 33696/3; 2 km NW of Malko Tarnovo (= bifurcation to Stoilovo), UTM NG 44, 42.0071°N 27.5044°E, leg. Erőss 29.7.1997, coll. Erőss/3; Ropotamo River right bank, UTM NG 67, 42.32°N 27.74°E, leg. Szigethy 4.7.1973, HNHM 49530/1; Zdravec im Rodopi Mountains, UTM n. det., leg. Uminski, 19.9.1957, HNHM 40344/1.

Greece, Thráki, 1 km W of Neohóri, UTM LF 06, 41.22°N 24.60°E, leg. Kiss & Pintér 5.7.1986, HNHM 29883/1 (juv.); 2 km N of Xánthi (= direction to Stavroúpoli), on limestone rocks W of the highway, 140 m alt., UTM LF 25, 41.1591°N 24.8806°E, leg. Subai 27.07.1990, S 15515/2; 2.1 km from the highway Xánthi–Stavroúpoli direction Ehínos, on marble rocks, 220 m alt., UTM LF 26, 41.2085°N 24.8612°E, leg. Subai 24.05.1997, S 15518/4; forest border 700 m from Melivoia Village direction Kotili, crystalline rocks, 415 m alt., UTM LF 27, 41.3328°N 24.9218°E, leg. Subai 24.05.1997, S 15516/3; forest border 1.8 km from Melivoia Village direction Kotili, in leaf litter, crystalline rocks, 450 m alt., UTM LF 27, 41.3354°N 24.9063°E, leg. Subai 24.05.1997, S 15517/6; 6.3 km from Amaxádes direction Íasmos (= 1 km from Kopteró direction Íasmos), on limestone rocks approx. 100–150 m N of the highway, 60 m alt., UTM LF 45, 41.1204°N 25.1406°E, leg. Subai 27.07.1990, S 15638/1; 2.6 km from Mákri direction Komotiní (on the old highway), mountain with cave beside new highway, on limestone rocks, 100 m alt., UTM LF 92, 40.8758°N 25.7095°E, leg. Subai 26.07.1990, S 15635/2; gorge at NW border of Avas (= 13 km N of Alexandroúpoli), on limestone rocks, 100 m alt., UTM MF 02, 40.9366°N 25.9129°E, leg. Subai 26.07.1990, S 15636/2. — Makedonía, 2.9 km from Ahladia direction Káto Nevrokópi, no lime stone, 690 m alt., UTM GL 48, 41.3885°N 23.9748°E, leg. Subai 22.05.1997, S 15525/21 + 1 (alk.); Falakró Mountains, 3 km from the bifurcation Vólakas direction skiing center, deciduous forest with limestone rocks, 1200 m alt., UTM KF 57, 41.2952°N 24.0091°E, leg. Subai 08.05.1995, S 15514/8 + 6 (alk.); upper border of gorge 1 km from Mikroklissoúra direction Potami, on limestone rocks, 400 m alt., UTM KF 58, 41.3867°N 24.0698°E, leg. Subai 22.05.1997, S 15526/9 + 3 (juv.); oak forest 12.9 km from Sidirónero direction Livaderó, in leaf litter, crystalline rocks, 600 m alt., UTM KF 67, 41.2740°N 24.2088°E, leg. Subai 22.05.1997, S 15524/2 + 1 (juv.) + 1 (alk.); mountain slope at NE border of Sidirónero, river valley, among herbs and under stones, 650 m alt., UTM KF 68, 41.3686°N 24.2339°E, leg. Subai 22.05.1997, S 15522/3; beech forest 3.2 km N of Makriplággio (along the highway), under stones, in leaf litter, crystalline rocks, 900 m alt., UTM KF 76, 41.2350°N 24.2945°E, leg. Subai 8.5.1995, S 15513/8 + 2 (alk.); leg. Subai 22.5.1997, S 15523/6 + 4 (alk.); on low marble rocks at Disvato Village, under stones and in leaf litter, 450 m alt., UTM KF 95, 41.0681°N 24.5713°E, leg. Subai 26.05.1997, S 15521/2; mountain E of Makrihóri, beside a marble quarry, 650 m alt., UTM LF 04, 41.0692°N 24.6298°E, leg. Subai 07.05.1995, S 15511/1; small river gorge 4.1 km from Kehrókambos direction Makrihóri, stone hedge, under stones, 485 m alt., UTM LF 05, 41.1292°N 24.6448°E, leg. Subai 26.05.1997, S 15520/2; in forest at W border of Stavroúpoli, Nestos river W bank, on limestone rocks, 120 m alt., UTM LF 06, 41.2031°N 24.7056°E, leg. Subai 7.5.1995, S 15512/11; leg. Subai 24.5.1997, S 15519/5 + 1 (juv.); NE border of Parádissos, on limestone rocks, 60 m alt., UTM LF 15, 41.0843°N 24.7612°E, leg. Subai 25.05.1997, S 15634/1.

Remarks: Specimens from more humid forested areas tend to have larger shells with a higher spire than those from more arid habitats, where the shells tend to be flatter and have a larger umbilicus. Next to populations with a wide range in shell size, there are also populations which contain exclusively large specimens. However, these are considered conspecific, because they comply with all other character states of the other populations.

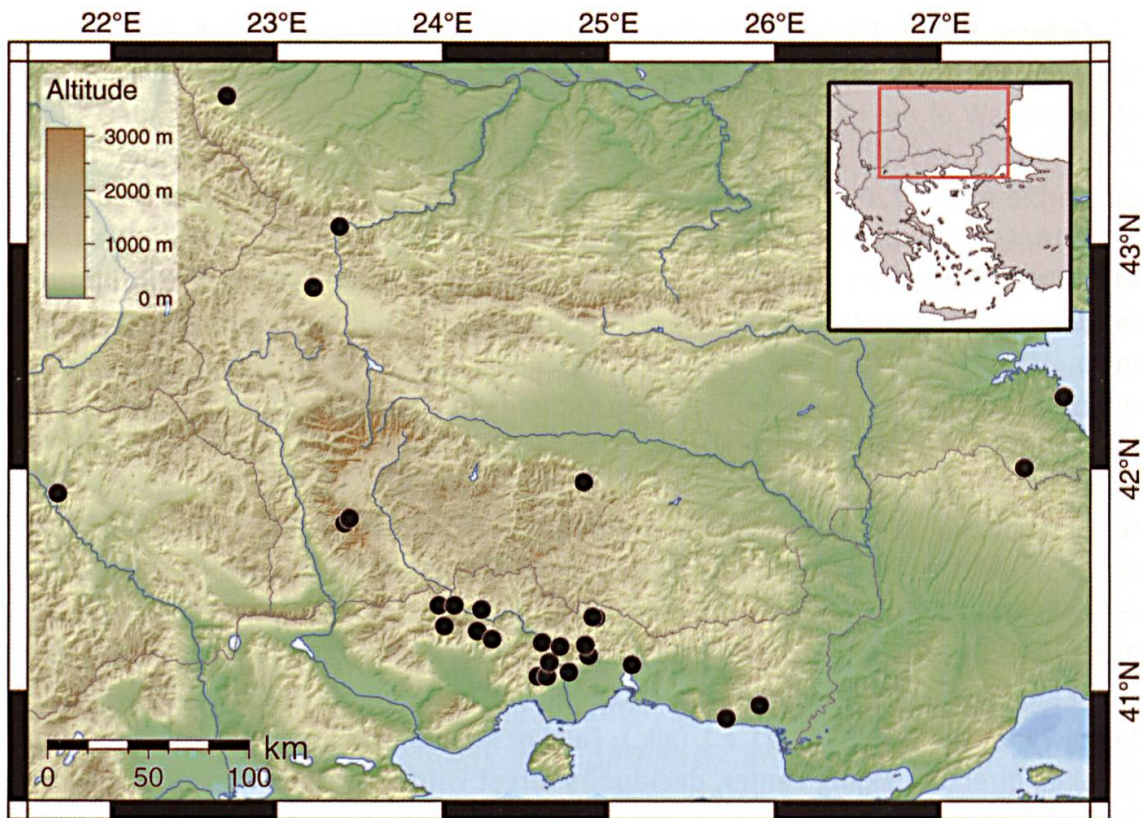


Fig. 39. Distribution of *Lindholmiola pirinensis*.

Distribution (Fig. 39): *Lindholmiola pirinensis* is well known from the mountains in western and southern Bulgaria and in the northern part of Greece north to the area between Kavála–Dráma and in Thracia. The westernmost record is from Fyrom in the Vardar valley close to Katlanovo

***Lindholmiola regisborisi* (A. J. WAGNER, 1927)** Figs 40–42, 43, 46

1927 *Caracollina regis-borisi* A. J. WAGNER, *Annales zoologici Musei Polonici Historiae Naturalis*, 6 (4): 364, Taf., 19 Fig. 166–168.

1957 (*Lindholmiola* ?) *regisborisi*, – Jaeckel, Klemm & Meise, *Abhandlungen und Berichte aus dem Staatlichen Museum für Tierkunde in Dresden*, 23 (2): 165.

1988 *Lindholmiola regisborisi*, – Reischütz, *Annalen des Naturhistorischen Museums in Wien*, 90 (B): 347.

1990 *Lindholmiola regisborisi*, – Fechter & Falkner, *Steinbachs Naturführer*: 222.

Diagnosis: shell planispiral, strongly haired, umbilicus dish-like, perspective, long bursa copulatrix.

Description of shell: shell almost planispiral, basic colour light brown to yellowish-brown; initial half of the protoconch whorl smooth, then with a very fine and dense radial sculpture; teleoconch surface with strong radial riblets of different size producing an undulating sculptural pattern (magnification required), whole shell with a dense granulation, ventral side of the shell with fine radial riblets and granulation; shells strongly haired, with a hair-free sub-sutural zone followed by a zone of permanent hairs around the blunt periphery of the shell (hairs in this area 0.8–2.3 mm long), ventral side of the shell usually without hairs, the umbilicus with very short bristles; shell with $5\frac{3}{4}$ –7 regularly increasing and well rounded whorls, with a blunt shoulder; suture very deep; umbilicus dish-like, perspective, diameter 2.4–4.2 mm; aperture very oblique, slightly curved in lateral view; in frontal view subquadrate to obliquely oval, strongly cut out on the left side, peristomial insertions with a gap of 2.6–4.1 mm; parietal callus very thin, undulating; peristome sharp, strongly broadened apically and laterally, slightly reflected basally; oblique columellar reflection, but only covering ca 1/10 of its diameter.

Measurements: H: 5–6.25; D: 12.5–16.5; aH: 4.85–6.4 (2–3.1); aW: 5.9–8.

Details of body (according to 8 animals from 400 m S of Kehrókambos): body dark brown to blackish-greyish, head and eye-stalks grey with a dark-brown tip; tale grey; sole cream with greyish lateral rims; mantle along the lung vein with two stripes of dark-brown pigmentation of rounded spots; secondary ureter opens 0.5–1.5 mm from the pneumostome, where it splits into two canals.

Morphology of the genital organs (Fig. 46): penis relatively short, slightly thickened, penial glandular tissue covers ca $\frac{1}{3}$ – $\frac{1}{2}$ of the total penis length, penial lumen with two equally sized, serrated pilasters, starting at the distal penial wall and stretching to the penial pore, sometimes with short perpendicular folds between the pilasters; vagina very short, somewhat broadened; glandula narrow with a short stalk and a long and scarcely folded part; bursa copulatrix reaching twice the length of the glandula with a pedunculus occupying half of the total length, vesicle strongly inflated; atrial lumen with a large, broad and flat, serrated pilaster, connecting to the vaginal lumen and reaching the proximal end of the vagina; opposite side of the atrial lumen with a semi-circular, keeled fold.

Differential diagnosis: Due to the large planispiral shell with the shouldered whorls, the long hairs and the large dish-like umbilicus, this species cannot be confused with any other species of *Lindholmiola*. Other differentiating features are the unusually long bursa copulatrix with its clearly separated vesicle, and the specific formation of penial and atrial pilasters.

Type specimens: Greece, Thráki, Xánthi, UTM LF 25, 41.14°N 24.89°E, syntypes: NMNH 3167/4.

Additional specimens examined:

Greece, Makedonía, limestone mountain approx. 2.5 km NNE of Zarkadía (along the road), 450 m alt., UTM LF 04, 41.0288°N 24.6417°E, leg. Fauer, 18.08.1979, S 12475/2; leg. Kiss & Pintér 7.7.1986, HNHM 29888/6 + 4 (juv.); leg. Fauer & Subai 22.09.1989, S 13977/58; leg. Subai 7.5.1995, S 14082/16; mountain E of Makrihóri, beside a marble quarry, 650 m alt., UTM LF 04, 41.0692°N 24.6298°E, leg. Subai 07.05.1995, S 14083/4; stone hedge in valley of two mountains 1 km from Ágios Kosmás direction Makrihóri, 380 m alt., UTM LF 04, 41.0783°N 24.6536°E, leg. Subai 26.05.1997, S 15472/17; valley 2.5 km E of Makrihóri (= direction Kehrókambos), beside village ruins, on limestone rocks, 180 m alt., UTM LF 04, 41.0466°N 24.6462°E, leg. Subai 26.05.1997, S 15473/16; small river gorge 4.1 km from Kehrókambos direction Makrihóri, stone hedge, under stones, 485 m alt., UTM LF 05, 41.1292°N 24.6448°E, leg. Subai 26.05.1997, S 15474/1; 7.2 km from Kehrókambos direction Makrihóri, at crossing to Skopós, under stones, 550 m alt., UTM LF 05, 41.1043°N 24.6392°E, leg. Subai 26.05.1997, S 15475/3; 400 m S of Kehrókambos, under (lime) stones, 390 m alt., UTM LF 05, 41.1514°N 24.6454°E, leg. Subai 07.05.1995, S 14086/13 + 14 (alk.); 4 km from Kehrókambos direction Stavroúpoli, on low limestone rocks, approx., 180 m alt., UTM LF 06, 41.1806°N 24.6687°E, leg. Subai 07.05.1995, S 14085/1; limestone mountain W of Stavroúpoli (= at the opposite bank of Néstos river), in forest, on limestone rocks, 120 m alt., UTM LF 06, 41.2031°N 24.7057°E, leg. Subai 27.07.1990, Maa/3, S 14059/35; leg. Subai 24.05.1997, S 15471/25 + 5 (juv.); Parádissos Village, UTM LF 15, 41.08°N 24.76°E, leg. Kiss & Pintér 7.7.1986, HNHM 29889/12 + 2 (juv.); leg. Maassen 7.1980, Maa/11 + 9 (juv.); NE border of Parádissos, on limestone rocks, 60 m alt., UTM LF 15, 41.0843°N 24.7612°E, leg. Subai 25.05.1997, S 15476/11 + 1 (juv.). — Thráki, 2 km E of Stavroúpoli, UTM LF 06, 41.21°N 24.73°E, leg. Kiss & Pintér 5.7.1986, HNHM 29887/1 + 4 (juv.); gorge near Xánthi, UTM LF 25, 41.14°N 24.88°E, leg. Schütt 2.5.1962, HNHM 39235/3, SMF 279328/4; leg. Maassen 7.1980, Maa/18 + 8 (juv.); 2 km N of Xánthi (= direction to Stavroúpoli), on limestone rocks W of the highway, 140 m alt., UTM LF 25, 41.1591°N 24.8806°E, leg. Subai 27.07.1990, S 14058/43.

Turkey, Marmara, Marmara Adasi, 40.59°N 27.56°E, 04.07.1976, leg. Oberling & Gerber, NMBE 515643/2; ditto, 08.08.1977, leg. Oberling & Gerber, NMBE 515642/1, NMBE 515633/8; Kaleh, Marmara Adasi, 40.62°N 27.62°E, 08.08.1977, leg. Oberling & Gerber, NMBE 515630/20.

Remarks: The shells of *L. regisborisi* are not variable, there are no local forms of this species known so far.

Figs 40–42. *Lindholmiola regisborisi*. Fig. 40: syntype *Caracollina regis-borisi*, NMNH (Sofia) 3167/4, Greece, Thrakia, Xanthi, D = 17.4 mm; Fig. 41: NMBE 515619, Greece, Makedonía, 400 m S of Kehrókambos, D = 15.01 mm; Fig. 42: NMBE 515630, Turkey, Marmara Adasi, Kaleh, D = 14.78 mm. — All photos Neubert/Bochud, × 3.



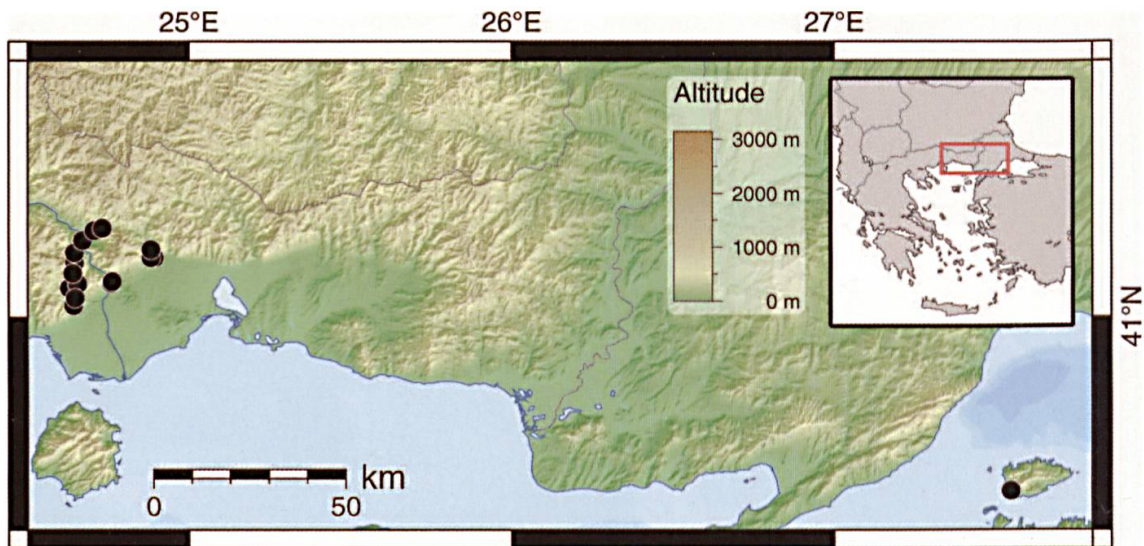


Fig. 43. Distribution of *Lindholmiola regisborisi*.

Distribution (Fig. 43): This species is known to live in a small area in the Lekánis Mountains in Greece, west of the Néstos River, in the lower Néstos valley between Stavroúpoli and Parádisos and east of the Néstos River to Xánthi in Thráki. The record from Marmara Adasi is isolated from the Greek distribution area, and is probably the result of an introduction due to anthropogenic activities. This is the first record of this species for Turkey.

***Lindholmiola reischuetzi* FALKNER, 1995** Figs 28, 47–50, 51

1907 *Helix (Gonostoma) lens* var. *insularis* O. BOETTGER, *Nachrichtsblatt der Deutschen Malakozoologischen Gesellschaft*, 39 (1): 34 [several times preoccupied].

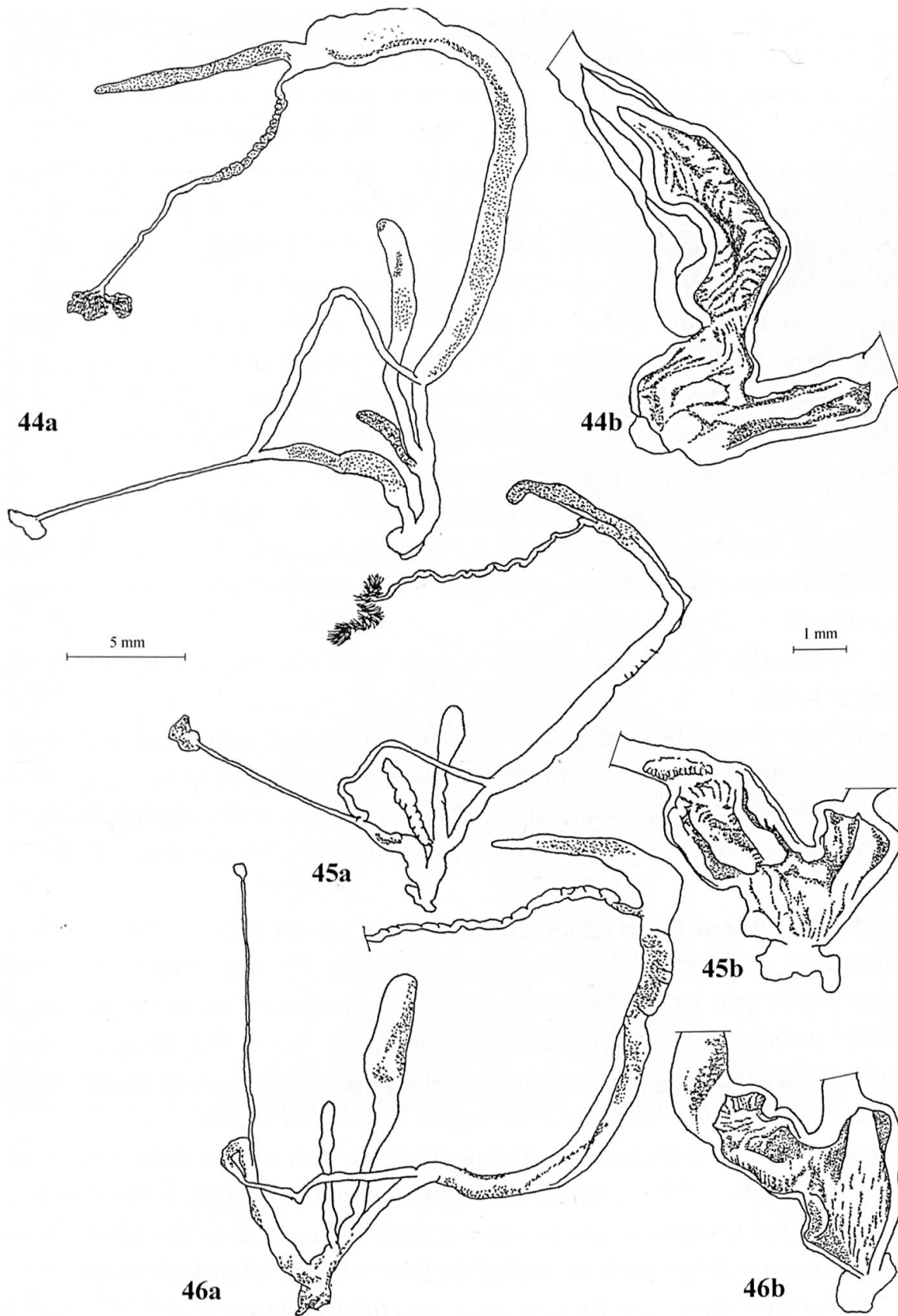
1918 *Caracollina lens insularis*, – Hesse, *Nachrichtsblatt der Deutschen Malakozoologischen Gesellschaft*, 50: 109.

1960 *Lindholmiola lens insularis*, – Urbanski, *Bulletin de l'Institut Zoologique de l'Académie Bulgare des Sciences*, 9: 91. Taf. 4 Fig. 4 a–c, 5 a–c.

1983 *Lindholmiola lens insularis*, – Reischütz, *Annalen des Naturhistorischen Museums in Wien*, 85 (B): 135.

1988 *Lindholmiola lens insularis*, – Reischütz, *Annalen des Naturhistorischen Museums in Wien*, 90 (B): 347.

1995 *Lindholmiola reischuetzi* FALKNER, *Heldia*, 2 (3/4): 97 (nom. nov. pro *Helix (Gonostoma) lens* var. *insularis* O. BOETTGER, 1907).



Figs 44–46. Genital organs of *Lindholmiola* species. Fig. 44: *Lindholmiola gyria*, a: situs, b: lumina of genital organs, Turkey, Vilayet Antalya, Phaselis; Fig. 45: *Lindholmiola barbata*, a: situs, b: lumina of genital organs, Greece, Island Kriti, Nomos Haniá, Soúda Bay; Fig. 46: *Lindholmiola regisborisi*, a: situs, b: lumina of genital organs, Greece, Makedonía, 400 m S of Kehrókambos.

Diagnosis: shell flat, lentiform, usually not haired, with a blunt keel, parietum with a very thick callus, vagina completely reduced,

Description of shell: shell flat, lentiform, basic colour light brown to yellowish-brown; initial 1–1½ of the teleoconch whorls smooth, then with a fine and dense radial sculpture, becoming stronger on the subsequent whorls, developing to small riblets; ventral side of the shell usually with fine radial stripes only, sometimes with small riblets; whole shell with a dense granulation; shell usually not haired, but if so, then restricted to a narrow stripe just above the blunt peripheral keel (hairs 0.5–0.8 mm, yellowish); shell with 5½–7 regularly increasing and flat whorls, with a blunt keel; shells tend to produce scalarid forms (see remarks); suture shallow; last whorl slightly ascending, but descending before the aperture with a white coloured area; umbilicus dish-like, perspective, diameter 1.7–3.3 mm; aperture very oblique, slightly curved in lateral view; in frontal view of semi-circle form, peristomial insertions with a gap of 2–3.1 mm, parietal callus a very thick, bar-like structure; peristome sharp, broadened apically and laterally, often slightly reflected basally.

Measurements (in mm): H: 3.1–4.7; D: 9.1–13.3; aH: 2.5–4.7(1.4–2.8); aW: 3.4–5.3.

Details of body (according to 6 animals from 4 km of Kehrókambos in direction of Stavroúpoli): head and dorsum dark brown to grey; sole cream with brownish lateral rims; mantle above the secondary ureter with one stripe of dark-brown pigmentation; secondary ureter opens 0.5–1 mm from the pneumostome.

Morphology of the genital organs (Fig. 28): penis relatively short, slightly thickened, penial glandular tissue covers only 1/4 of total penis length, penial lumen with two large pilasters with one of them starting at the proximal penial wall and stretching to the penial pore, the second branching into two arms before reaching the proximal penial wall, several small, perpendicularly arranged accessory folds present; vagina completely reduced, glandula and bursa copulatrix branch off the atrium, glandula with a short stalk and a long and scarcely folded part; bursa copulatrix reaching the length of the glandula or somewhat shorter, vesicle almost not discernible; atrial lumen filled with a large, broad and flat, pillow-like pilaster, connecting to a few short folds.

Differential diagnosis: On average, *L. spectabilis* is larger than *L. reischuetzi*. Equally sized shells can always be identified as *L. spectabilis* by its larger aperture, the weak palatal callus, and the usually narrower umbilicus. The reduced vagina is a clear autapomorphic character that separates *L. reischuetzi* from all other species of *Lindholmiola*.



Figs 47–50. *Lindholmiola reischuetzi*. Fig. 47: syntype *Helix (Gonostoma) lens* var. *insularis*, SMF 7048/1, Greece, Island Thássos, D = 9.4 mm; Fig. 48: NMBE 515640, Greece, Makedonía, Halkidiki Peninsula, close to the cave of Petrálona, D = 10.13 mm; Fig. 49: NMBE 515639, Greece, Thráki, Canyon 2 Km N of Xánthi (form with large umbilicus and broad whorls), D = 12.43 mm; Fig. 50: NMBE 515641, Greece, Makedonía, N boundary of Taxiárhis (scalarid form), D = 12.01 mm. — All photos Neubert/Bochud, × 3.

Around the Bay of Korinthos, there is a strongly keeled form of *L. lens* (*callo-juncta*), which somewhat resembles *L. reischuetzi*. This form of *L. lens*, however, has a larger shell, and its palatal callus is only slightly reinforced. Other forms of *L. lens* have a more raised spire and always a weak palatal callus.

Type specimens: Greece, Thássos Island, UTM n. det., ex Speidel, ex coll. O. Boettger, syntypes *insularis*: SMF 7048/1, 7049/1, 101953/4.

Additional specimens examined:

Greece, Makedonía, Halkidikí Peninsula, 500 m N of Eleohória, on low limestone rocks, 170 m alt., UTM FK 86, 40.3434°N 23.1613°E, leg. Subai 05.05.1995, S 15485/16; Halkidikí Peninsula, in valley beside the cave of Petrálona, 360 m alt., UTM FK 87, 40.3759°N 23.1681°E, leg. Subai 05.05.1995, S 15486/5; leg. Subai 29.5.1997, S 15487/179; N N border of Galipsós, on limestone rocks, approx. 200 m alt., UTM GL 42, 40.8062°N 23.9502°E, leg. Subai 06.05.1995, S 15484/13 + 10 (alk.); mountain slope N of Podohóri, on limestone rocks, 450 m alt., UTM KF 42, 40.8473°N 24.0249°E, leg. Subai 27.05.1997, S 15505/25; Simvolo Mountains, 1.2 km from Sidirohóri direction Foliá (= W of Karavangélis), on limestone rocks, 250 m alt., UTM KF 52, 40.8380°N 24.1375°E, leg. Subai 27.05.1997, S 15510/62; Kokkinohóri, UTM KF 52, 40.81°N 23.99°E, Neuteboom 11.7.1976, NNM/2 + 3 (juv.) + 16 (alk.); mountain slope 4.5 km W of the bifurcation to Loutrá Eleftheró (= 48 km W of Kavála on the street along the bank), on limestone rocks, 30 m alt., UTM KF 51, 40.7211°N 24.0601°E, leg. Fauer & Subai 21.09.1989, S 15492/26; N border of Taxiárhis, under crystalline stones, 500 m alt., UTM KF 66, 41.2328°N 24.1888°E, leg. Subai 22.05.1997, S 15508/36 + 4 (alk.); 11 km above Kalífitos, UTM KF 66, 41.25°N 24.29°E, leg. Fauer 31.7.1971, S 15497/1; 2.6 km SW of Makriplággio, on limestone rocks, 520 m alt., UTM KF 66, 41.2082°N 24.2519°E, leg. Subai 08.05.1995, Maa/7, S 15491/37 + 13 (alk.); above the ruins of Philippi near Krinídes, on limestone rocks, 85 m alt., UTM KF 74, 41.0128°N 24.2851°E, leg. Neuteboom 12.7.1976, NNM/23 + 4 (juv.) + 14 (alk.); leg. Maassen 7.1980, Maa/91 + 5 (juv); leg. Kiss & Pintér 7.7.1986, HNHM 29894/18 + 3 (juv.); leg. Subai 7.5.1995, S 15496/2; 5 km from Limnia direction Zigós, on low limestone rocks and under stones, 730 m alt., KF 74, 41.0589°N 24.3816°E, leg. Subai 26.05.1997, Maa/12, S 15499/118; on marble rocks at N border of Ipsili Ráhi, approx. 500 m alt., UTM KF 76, 41.2123°N 24.3469°E, leg. Subai 23.05.1997, S 15507/31; 1 km E of Nikifóros, UTM KF 76, 41.17°N 24.33°E, leg. Kiss & Pintér 5.7.1986, HNHM 29911/104 + 55 (juv. + fragment); bridge 1.8 km E from Nikifóros, on limestone rocks, approx. 235 m alt., UTM KF 76, 41.1726°N 24.3345°E, leg. Subai 23.05.1997, S 15506/10; in Makriplággio Village, beech forest and border of forest with stone walls, under stones and in leaf litter, crystalline rocks, 880 m alt., UTM KF 76, 41.2267°N 24.2713°E, leg. Subai 22.05.1997, S 15509/4; 2 km E of Kavála, UTM KF 83, 40.95°N 24.45°E, leg. Maassen 7.1980, Maa/17 + 4 (juv); 2.5 km E of Kavála, hill slope with small limestone rocks, 20 m alt., UTM KF 83, 40.9486°N 24.4438°E, leg. Fauer & Subai 22.09.1989, S 15488/9; 3 km W of Paleá Kavála, on limestone rocks above the river, 200 m alt., UTM KF 84, 41.0009°N 24.3934°E, leg. Subai 07.05.1995, S 15494/74; 2.5 km from Paleá Kavála direction Korifés, on low limestone rocks and under stones, 500 m alt., UTM KF 84, 41.0170°N 24.4388°E, leg. Subai 07.05.1995, S 15493/57 + 5 (alk.); S exposed slope 4.2 km from Paleá Kavála direction Halkeró, S exposed mountain slope, on limestone rocks, 440 m alt., UTM KF 84, 40.9994°N 24.4273°E, leg. Subai 26.05.1997, S 15502/38; on limestone rocks at SE border of Likóstomo, 740 m alt., UTM KF 85, 41.1078°N 24.4424°E, leg. Subai 26.05.1997, S 15498/14; 800 m W of Dipótamos, on limestone rocks beside highway, 690 m alt., UTM KF 95, 41.1196°N

24.5762°E, leg. Subai 26.05.1997, S 15503/14; limestone mountain approx. 2.5 km NNE of Zarkadía (along the road), 450 m alt., UTM LF 04, 41.0288°N 24.6417°E, leg. Kiss & Pintér 7.7.1986, HNHM 29890/153 + 39 (juv. + fragment); leg. Fauer & Subai 22.09.1989, Maa/9, S 15489/179; leg. Subai 7.5.1995, S 15490/24; valley 2.5 km E of Makrihóri (= direction Kehrókambos), beside village ruins, on limestone rocks, 180 m alt., UTM LF 04, 41.0466°N 24.6462°E, leg. Subai 26.05.1997, S 15500/24; stone hedge in valley of two mountains 1 km from Ágios Kosmás direction Makrihóri, 380 m alt., UTM LF 04, 41.0783°N 24.6536°E, leg. Subai 26.05.1997, S 15501/9; 4 km from Kehrókambos direction Stavrouáli, on low limestone rocks, approx., 180 m alt., UTM LF 06, 41.1806°N 24.6687°E, leg. Subai 07.05.1995, S 15495/47 + 7 (alk.); limestone mountain W of Stavrouáli (= opposite bank of Néstos river), in forest, on limestone rocks, 120 m alt., UTM LF 06, 41.2031°N 24.7057°E, leg. Subai 27.07.1990, S 15482/3; leg. Subai 24.5.1997, S 15483/24 + 1 (juv.); Parádissos Village, UTM LF 15, 41.08°N 24.76°E, leg. Kiss & Pintér 7.7.1986, HNHM 29896/19 + 2 (juv.); leg. Maassen 7.1980, Maa/45 + 3 (juv); NE border of Parádissos, on limestone rocks, 60 m alt., UTM LF 15, 41.0843°N 24.7612°E, leg. Subai 25.05.1997, S 15504/9 + 2 (juv.) + 1 (alk.). — Thráki, 2 km N of Xánthi (= direction to Stavrouáli), on limestone rocks W of the highway, 140 m alt., UTM LF 25, 41.1591°N 24.8806°E, leg. Subai 27.07.1990, S 15481/2. — Thássopoula Island, UTM LF 02, 40.82°N 24.70°E, leg. Valkoura, 1842, SMF 158896/5. — Thássos Island, olive grove at S border of Alikí, under flat stones, UTM LE 09, 40.6050°N 24.7416°E, leg. Fauer & Subai 21.09.1989, S 15477/10; 1 km W of Alikí, UTM LE 09, 40.60°N 24.72°E, leg. Kiss & Pintér 6.7.1986, HNHM 29915/1; 15 km from Kalívia direction Alikí, on limestone rocks, 110 m alt., UTM LE 09, 40.5914°N 24.6683°E, leg. Fauer & Subai 21.09.1989, S 15478/4; Theológos, UTM LF 00, 40.66°N 24.69°E, leg. Kiss & Pintér 6.7.1986, HNHM 29903/12 + 14 (juv.); on limestone rocks above cemetery of Theológos, 300 m alt., UTM LF 00, 40.6634°N 24.7022°E, leg. Fauer & Subai 21.09.1989, S 15479/37; narrow (partim) of a valley 2.8 km NE of Theológos, on marble rocks, 530 m alt., UTM LF 00, 40.6696°N 24.7329°E, leg. Subai 25.07.1990, S 15480/29; W of Thássos Town, UTM LF 01, 40.77°N 24.68°E, leg. Kiss & Pintér 6.7.1986, HNHM 29919/1.

Remarks: Shell size variations in *L. reischuetzi* are few. However, next to the widespread typical form of this species, there are two local forms that need to be mentioned: 1) the populations east and northeast of Dráma to the Lekánis Mountains (for example in Makriplághio, Taxiárhis, Ipsilí Ráhi, Nikifóros etc.) tend to build scalarid shells. The whorls of this form are stepped, and often the ventral side of the shells is covered by riblets; 2) the easternmost populations of *L. reischuetzi* (for example close to Stavrouáli and N of Xánthi) have flat shells with rapidly increasing whorls. It has to be stressed that these character states are restricted to those populations mentioned. However, on the Island Thássos these forms can be found mixed with the widespread form with all intergrades. For this reason, these local forms cannot be separated as geographical subspecies.

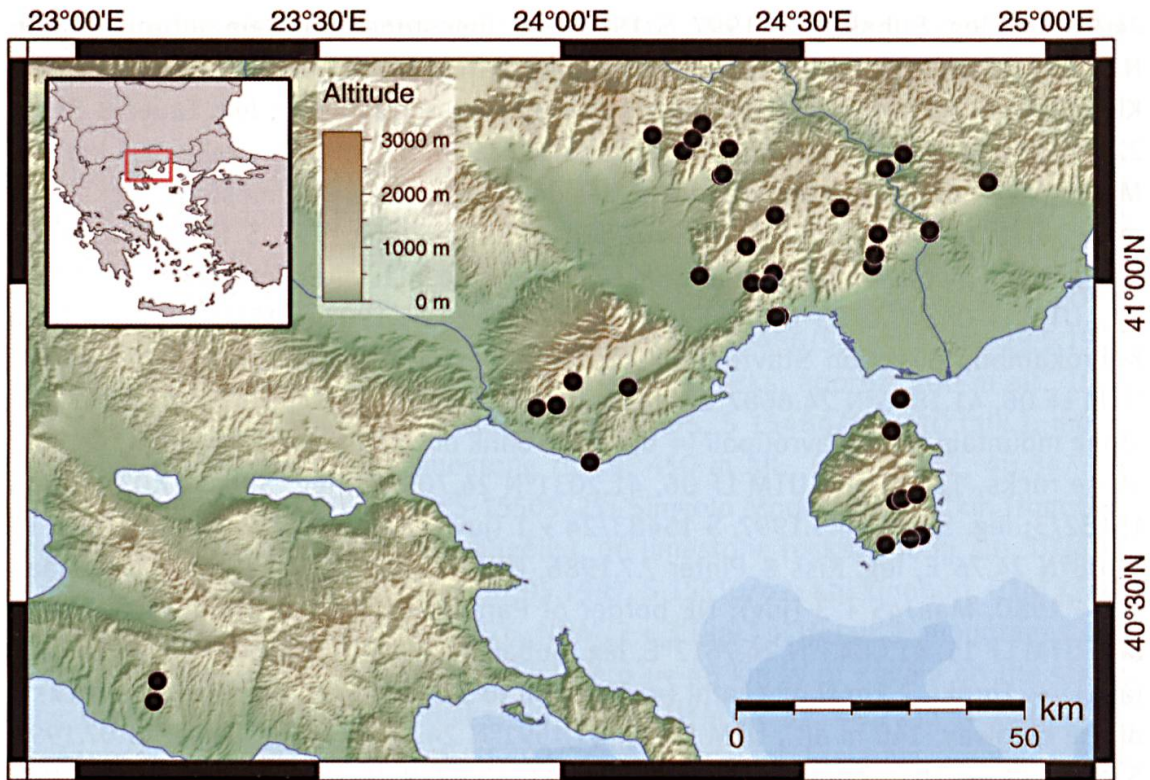


Fig. 51. Distribution of *Lindholmiola reischuetzi*.

Distribution (Fig 51): This species is recorded from north-eastern Greece from Makedonía to western Thráki, in the coastal stripe between the Dráma to Xánthi and the sea. It also lives on the islands of Thásson and Thássonopoula, and there is a small isolated population in the Southwest of the Halkidikí Peninsula.

***Lindholmiola spectabilis* URBANSKI, 1960** Figs 13, 15, 52–54, 55–56

1936 *Lindholmiola lens*, – Fuchs & Käufel, Archiv für Naturgeschichte, N. F. 5 (4): 651 [partim, only Angista canyon close to Drama] (non *lens* FÉRUSSAC).

1960 *Lindholmiola lens spectabilis* URBANSKI, Bulletin de l'Institut Zoologique de l'Académie Bulgare des Sciences, 9: 91, Taf. 4 Fig. 3 a–c.

1988 *Lindholmiola lens lens*, – Reischütz, Annalen des Naturhistorischen Museums in Wien, 90 (B): 347 (non *lens* FÉRUSSAC).

1990 *Lindholmiola spectabilis*, – Fechter & Falkner, Steinbachs Naturführer: 222, Abb. 4. and 7.

1995 *Lindholmiola spectabilis*, – Falkner, Heldia, 2 (3/4): 97.

Diagnosis: shell depressed, last whorl with a sharp, often whitish keel, umbilicus perspective, shell with a dense granulation,

Description of shell: shell depressed, basic colour light brown to yellowish-brown; initial $\frac{1}{2}$ –1 of the teleoconch whorls smooth, the following whorls with fine radial stripes, becoming stronger on the subsequent whorls and developing to small riblets, sometimes increasing on the last whorls to form ribs; ventral side of the shell with fine undulating radial stripes only; whole shell with a dense granulation, fine on the upper but coarser on the last whorls; shell usually not haired, but if so, then restricted to the area just above the blunt peripheral keel of the last whorl (hairs 0.6–0.8 mm); shell with 6–7 $\frac{3}{4}$ regularly increasing whorls, the upper 2–3 whorls slightly rounded, the subsequent whorls flat and slightly stepped; last whorl with a sharp, often whitish keel; suture shallow; last whorl slightly ascending, but descending before the aperture with a white coloured area; umbilicus perspective, diameter 1.56–3.6 mm (in some populations almost cylindrical; aperture oblique, strongly curved in lateral view, slightly undulating basally; in frontal view of semi-circle form, peristomial insertions with a gap of 2.3–4.7 mm, parietal callus very thin, almost indiscernible; peristome sharp, broadened laterally, often slightly reflected basally, but covering the umbilicus only slightly.

Measurements: H: 3.75–6.7; D: 9.1–16.1; aH: 3.6–6.4 (1.7–3.4) aW: 4.1–7.65.

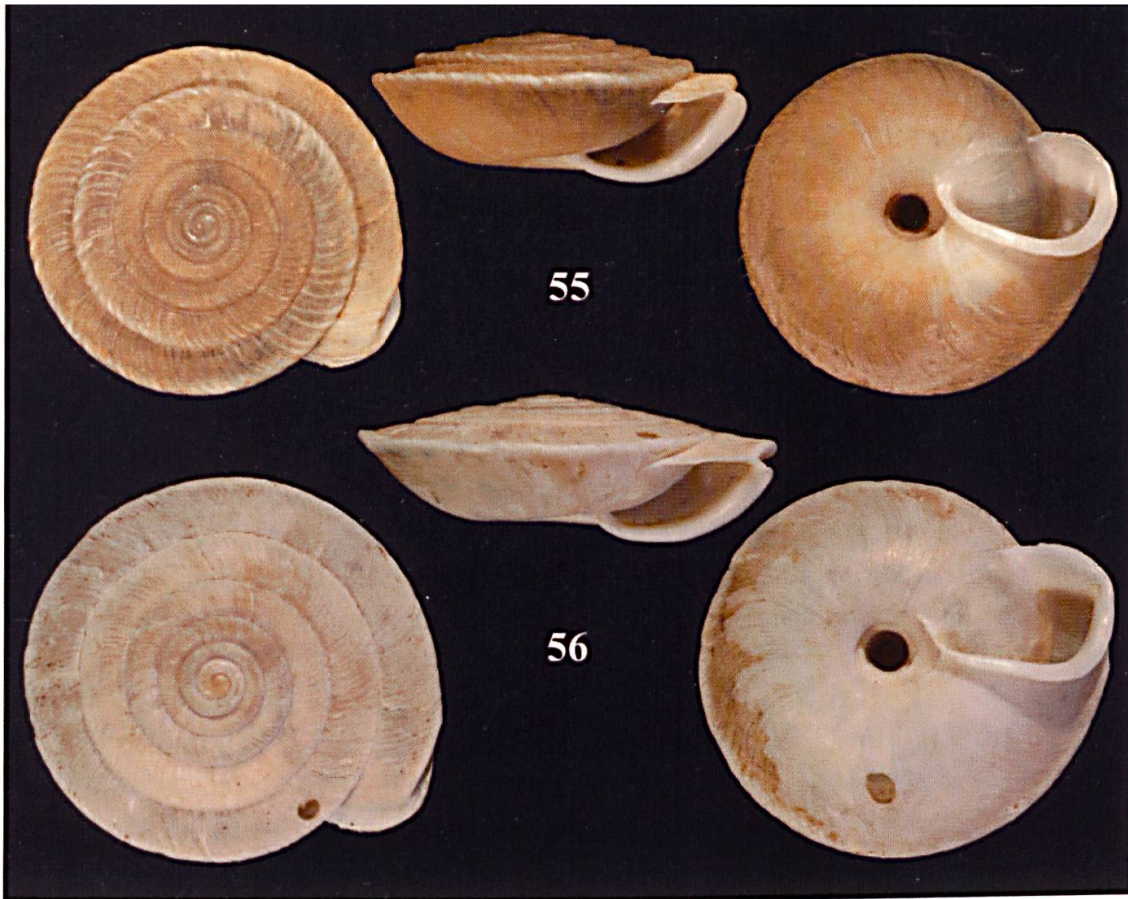
Details of body (according to 9 animals from 2.6 km SW of Makriplágio/6, and Falakró Mts., Ágios Pnevma plateau/3): dorsum light to dark brown to grey, flanks and tail usually lighter; sole very bright whitish to cream, with greyish lateral rims; mantle along the lung vein with two stripes of dark-brown pigmentation, sometimes dissolving in groups of spots; secondary ureter opens 1 mm from the pneumostome.

Morphology of the genital organs (Fig. 13): penis relatively short, slightly thickened, penial glandular tissue covers only $\frac{1}{3}$ of total penis length, penial lumen with three large pilasters starting at the proximal penial wall with some knot-like warts, the two marginal folds longer than the central one, distal penial lumen to the penial pore without folds; vagina short, slightly thickened, filled by a single pilaster stretching from the proximal end of the vagina through the atrial lumen to the atrial pore; glandula with a short narrow stalk and a long and scarcely folded part; bursa copulatrix reaching the length of the glandula or somewhat shorter, vesicle well discernible.

Differential diagnosis: This species is very similar to some local forms of *L. lens*, particularly to those with the more flattened whorls and the wide umbilicus, which live around the Bay of Korinthos and the north-eastern Pelopónnisos, both far away from the distribution area of *L. spectabilis*. Comparing equally sized specimens of both species, the aperture of *L. lens* is always broader and more oval, its lower border is flat and not undulating, the gap between the peristomial insertions is larger, its umbilicus is more perspective,



Figs 52–54. *Lindholmiola spectabilis*. Fig. 52: paratype *Lindholmiola lens spectabilis*, SMF 158640, Greece, Makedonía, (peninsula) Athos, monastery Kireta, D = 17.34 mm; Fig. 53: NMBE 515645, Greece, Makedonía, mountain slope N of Podohóri, (tightly coiled shell, narrow umbilicus), D = 12.02 mm; Fig. 54: NMBE 515644, Greece, Makedonía, N boundary of Taxiárhis (small, strongly ribbed, slightly scalarid form), D = 11.09 mm. — All photos Neubert/Bochud, × 3.



Figs 55–56. *Lindholmiola spectabilis*. Fig. 55: NMBE 515646, Greece, Makedonía, Kalithia in direction to Anthohóri (coarsely ribbed, slightly scalarid form), D = 11.48 mm; Fig. 56: NMBE 515647, Greece, Angítis Canyon, well at the Mara cave (large, wide umbilicus), D = 14.2 mm. — All photos Neubert/Bochud, $\times 3$.

its surface granulation is finer, and if there are hairs, the haired area is larger. Additionally, *L. lens* has only two and not three penial pilasters. Another quite interesting difference is the mating behaviour: While in *L. lens*, the mating partners stimulate each other with "rhythmic swaying lasting for hours, tender palming with the eye-stalks and kiss-like touches with the mouth", *L. spectabilis* is obviously more prosaic without "kisses and eye-stalk palming", which turned out to constitute a mating barrier between the two species (Fechter & Falkner, 1990: 222).

Often, *L. spectabilis* lives syntopic with *L. reischuetzi*. These two species can easily be separated, because on average, shells of *L. reischuetzi* are smaller, their aperture is narrower with the strong bar-like parietal callus, its umbilicus is more perspective, its vagina is reduced, and it has only two penial pilasters.

Type specimens: Greece, Makedonía, Athos [Peninsula], Kireta monastery, leg. Papasov 29.6.1936, paratypes *spectabilis*: SMF 158640/2.

Additional specimens examined:

Greece, Makedonía, on conglomerate rocks above Sidirókastro, 110 m alt., UTM GL 06, 41.2398°N 23.3954°E, leg. Subai 20.05.1997, S 15623/13 + 3 (alk.); castel of Séres, under stones, UTM GL 15, 41.09°N 23.55°E, leg. Fauer 29.7.1971, S 12457/6; N border of Inoússa, SSE exposed mountain slope, on limestone rocks, 200 m alt., UTM GL 25, 41.1059°N 23.6312°E, leg. Subai 21.05.1997, S 15617/3; on conglomerate rocks above Panórama, 650 m alt., UTM GL 36, 41.2511°N 23.8208°E, leg. Subai 21.05.1997, S 15619/126 + 8 (juv.) + 3 (alk.); marble quarry 3.8 km from Káto Vrontoú direction Panórama, 750 m alt., UTM GL 37, 41.2620°N 23.7880°E, leg. Subai 21.05.1997, S 15614/35 + 2 (alk.); 4.3 km from Káto Vrontoú direction Panórama, on limestone rocks, 750 m alt., UTM GL 37, 41.2620°N 23.7986°E, leg. Subai 21.05.1997, S 15615/6; river valley at N border of Káto Nevrokópi, on low limestone rocks, 650 m alt., UTM GL 38, 41.3498°N 23.8810°E, leg. Subai 21.05.1997, S 15616/5; Kalithia (= W of Dráma), UTM GL 45, 41.11°N 23.91°E, leg. Hemmen 24.06.1987, Maa/3; river gorge 500 m from Kalithia direction Anthohóri, on rocks, 215 m alt., UTM GL 45, 41.1249°N 23.9293°E, leg. Subai 08.05.1995, S 15632/7 + 1 (alk.); Angítis, on limestone rocks beside spring at cave of Maras, 150 m alt., UTM GL 46, 41.2210°N 23.8928°E, leg. Fauer 10.08.1979, S 12877/4; leg. Subai 21.05.1997, S 15613/37; leg. Gittenberger & Uit de Weerd 21.05.1999, NNM/10; approx. 6 km N of Prossotsáni, on lime conglomerate rocks, 340 m alt., UTM GL 46, 41.2225°N 23.9694°E, leg. Subai 08.05.1995, S 15626/23; approx. 8 km from Prossotsáni direction Granítis, on limestone rocks beside a creek, 500 m alt., UTM GL 47, 41.2597°N 23.9737°E, leg. Subai 22.05.1997, S 15611/58 + 5 (alk.); 400 m from the highway Prossotsáni–Granítis direction Vólakas, on limestone rocks, 680 m alt., UTM GL 47, 41.2821°N 23.9815°E, leg. Subai 08.05.1995, S 15625/21; N border of Galipsós, on limestone rocks, approx. 200 m alt., UTM GL 42, 40.8062°N 23.9502°E, leg. Subai 06.05.1995, S 15630/14 + 7 (alk.); mountain slope N of Podohóri, on limestone rocks, 450 m alt., UTM KF 42, 40.8473°N 24.0249°E, leg. Subai 27.05.1997, S 15624/17 + 1 (juv.); limestone gorge 6.5 km SE of Alistráti, on rocks and under stones, 80 m alt., UTM GL 54, 41.0224°N 24.0067°E, leg. Subai 23.05.1997, S 15621/30 + 3 (juv.) + 3 (alk.); 3–3.5 km from Petroússa direction Pirgi, small gorge, on low limestone rocks, 510 m alt., UTM KF 46, 41.2332°N 24.0135°E, leg. Subai 21.05.1997, S 15618/17 + 2 (alk.); 25.2 km from Akrovouni direction Pangéio peak, meadow with limestone rocks below the peak, 1780 m alt., UTM KF 53, 40.9113°N 24.0973°E, leg. Fauer & Subai 23.09.1989, S 15933/12; N border of Xiropótamos, on limestone rocks and under stones, 285 m alt., UTM FK 56, 41.1951°N 24.1002°E, leg. Subai 08.05.1995, S 15628/63 + 6 (alk.); Falakró Mountains, 3 km from the bifurcation Vólakas direction skiing center, deciduous forest with limestone rocks, 1200 m alt., UTM KF 57, 41.2952°N 24.0091°E, leg. Subai 08.05.1995, S 15633/11 + 2 (alk.); Falakró Mountains, border of Agio Pnevma plateau, meadow S of the skiing center, under stones, 1720 m alt., UTM KF 57, 41.2993°N 24.0637°E, leg. Subai 08.05.1995, S 15934/4 + 9 (alk.); Kalifitos (= NE of Dráma), UTM KF 66, 41.17°N 24.21°E, leg. Schütt 30.4.1962, SMF 279325/20; 11 km above Kalifitos, UTM KF 66,

41.25°N 24.29°E, leg. Fauer 31.7.1971, S 12472/5; 2.6 km SW of Makriplágio, on limestone rocks, 520 m alt., UTM KF 66, 41.2082°N 24.2519°E, leg. Subai 08.05.1995, S 15627/17 + 11 (alk.); N border of Taxiárhis, under crystalline stones, 500 m alt., UTM KF 66, 41.2328°N 24.1888°E, leg. Subai 22.05.1997, S 15612/50; mountain slope 1 km S from Vatholakkos, on low marble rocks and under stones, 450 m alt., UTM KF 66, 41.2224°N 24.1670°E, leg. Subai 22.05.1997, S 15935/2 + 29 (alk.); 1 km W of Peristéria (= direction Adriani), on limestone rocks, approx. 400 m alt., UTM KF 75, 41.1177°N 24.3837°E, leg. Subai 23.05.1997, S 15620/4 + 1 (juv.); 1.3 km from Agorá direction Peristéria, on limestone rocks, approx. 380 m alt., UTM KF 75, 41.1165°N 24.3244°E, leg. Subai 23.05.1997, S 15622/50.

Remarks: According to Urbanski (1960: 92), the holotype and 4 paratypes of *L. spectabilis* were deposited in the NMNH. Currently, these specimens could not be traced back in the museum in Sofia, and thus a paratype from the collection in SMF is figured.

Although the name *spectabilis* suggests that this is a large species within *Lindholmiola*, there are also populations with smaller or even dwarf-like shells known. Also, the shell's form can be quite variable. The population from the type locality has broad whorls and a wide umbilicus, and inhabits mainly valleys and the lower altitudinal ranges in the mountains. A quite differing form has a more densely coiled shell and a narrower umbilicus, and lives along the southern slopes of the Pangéo Mountain and the higher altitudes of the Falakró Mountains. Other populations comprise shells of normal size but with a mixture of shells with a dense or wide rib pattern, and populations, where only the one or the other phenotype is represented. Usually, shells with the wide rib pattern occur more often in the western part of the distribution area, while shells with the dense rib pattern are more abundant in the eastern part; the boundary is approximately along the Angítis River.

A very special form lives at the north-western boundary of the Lekánis Mountains between Agorá and Peristéria. The shells in these populations have extremely flat whorls with a very sharp keel and an extraordinarily wide umbilicus. Nonetheless, they are so similar in all other shell morphological characters that it is currently not possible to separate them on a subspecific level.

Distribution (Fig. 15): *Lindholmiola spectabilis* was described from Athos. Its distribution area covers the western boundary of the Vrontoū Mountains (Sidirókastro, Séres etc.) to the north-western slopes of the Lekánis Mountains east of Dráma. In northern direction, this species has been recorded up to Káto Nevrokópi and the Ágios Pnevma plateau in the Falakró Mountains.

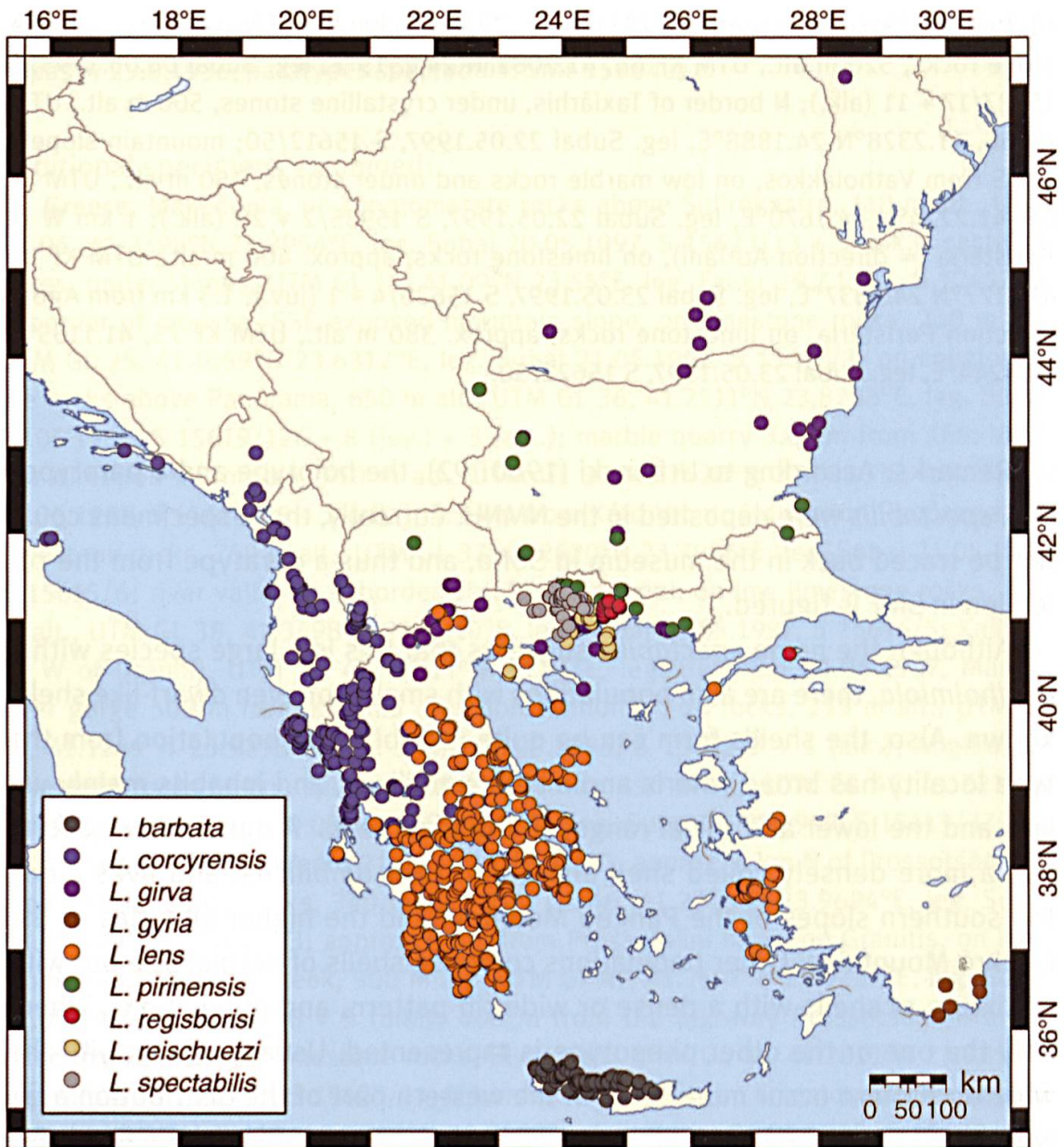


Fig 57. Distribution of the genus *Lindholmiola*.

Discussion

Three species of *Lindholmiola*, *L. corcyrensis*, *L. girva* and *L. lens*, inhabit quite large areas, while the distribution areas of another three species, *L. barbata*, *L. pirinensis* and *L. reischuetzi*, are much more restricted (the area of *L. reischuetzi* is small, but the species is quite abundant there) (Fig. 57). Only two species, *L. regisborisi* and *L. gyria*, have very small and isolated habitats. Particularly *L. gyria*, which is only known from a small area in south-western Turkey, has only been recorded from a very few places, and seems to be the most endangered species within the genus.

Judging from the voucher collections of the museums listed above, we know that in historical times, some species had much larger distribution areas. A good example is *L. corcyrensis*, which once could be found along the Dalmatian coast northwards to the delta of the Neretva River, and there were also records from the Gargano Peninsula in Italy. All these populations have to be considered extinct; there are no modern records for this species beyond the Albanian border. Also in its southern distribution area in the northern Pelopónnisos, this species has disappeared.

Sympatric or even syntopic occurrences of *Lindholmiola* species are numerous. The most widespread species, *L. lens* and *L. corcyrensis* can be found sympatrically on the Island of Kephallinia and the northwestern boundary of the Bay of Korinthos. Other sympatric occurrences are also known for *L. girva*, *L. regisborisi*, *L. reischuetzi*, *L. pirinensis* and *L. spectabilis*, always in differing combinations. Particularly eastern Macedonia in Greece is very rich in *Lindholmiola* species, and in some places, up to four species can be encountered (for example 2.5 km north-northeast Zarkadia, at the western boundary of Stavroupoli or north of Podohori). Until now, a sympatric occurrence of *L. girva* and *L. corcyrensis* has not been recorded.

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