

Two newly discovered species of the genus  
*Buliminus* BECK, 1837 (= *Petraeus* ALBERS, 1850) (Enidae)  
from Southern Israel.

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With 8 figures.

***Buliminus (Buliminus) sinaiensis* n. sp.**

(Figs. 1, 4, 5).

Holotype (*Buliminus* n° 3700) and 45 paratypes (n° 3701-3745) in moll.-coll., Hebrew University of Jerusalem, Zool. Dept. (n° 3734-6 in SMF 198999/3).

Type-locality — Negev, Har 'Arif 957 m, 90 km S Beer Sheva (34°43'30" E, 30°25'20" N or 124981 Israel grid).

Diagnosis. — *Buliminus sinaiensis* differs from *Buliminus halepensis* (PFEIFFER) of corresponding diameter in having 5½-6 whorls, of which  $\pm 3$  whorls compose the apex, against 6½ whorls of which  $\pm 4$  whorls compose the apex. The appendix of the ♂ excretory organs is in *sinaiensis* shorter and in *halepensis* longer than the penis.

Description of the shell (fig. 1). — The shell is dextrorsal, cylindric, thin, light horny-brown, glossy, semitransparent. It is composed of 5½ to 6 whorls. The protoconch has two smooth whorls. The other whorls are faintly and delicately striated. The penultimate whorl is only slightly wider than the preceding whorls, sometimes it is slightly narrower. The apex consists of  $\pm 3$  whorls. The first whorls are very slightly convex, the others are nearly flat. The suture is very shallow, except on the last whorl, where it is slightly deeper. The aperture is rounded. Its height is less than the half of the shells height. The outer and the inner lips insert distantly on the penultimate whorl, and are connected by a strong callus. The peristome is white, thin, and reflexed slightly backwards. Its thickness is less than one millimeter.

Reproductive system (figs. 4, 5). — Two specimens from the type-locality were found alive, and have been dissected to examine their reproductive organs.

The albumen gland of the first specimen (n° 3744, fig. 4) is of creamish colour, bent, and grooved at its distal end. The relatively thin uterus, which is uniform in diameter, enters the thicker vagina. The diverticulum of the receptaculum seminis has near its insertion a diameter of 0.8 mm and thins out to a diameter of 0.1 mm. The ductus bursae is of  $\pm$  uniform diameter, only widening before its insertion in the relatively large bursa. The bursa reaches about a third of the

Table 1: Measurements and ratios of *Buliminus (Buliminus) sinaiensis*.

	Shell Height	Max. Diam.	Min. Diam.	Mouth Height
holotype (No. 3700)	20.4	9.6	7.6	9.0
43 paratypes (range)	17.6-21.6	8.5-10.0	6.7-7.9	7.6-9.5
(mean)	19.13	9.40	7.52	8.74

	Mouth Diam.	Shell Height Max. Diam.	Shell Height Mouth Height	Mouth Height Mouth Diam.
holotype (No. 3700)	7.4	2.16	2.27	1.22
43 paratypes (range)	5.9-7.4	1.84-2.19	2.09-2.37	1.17-1.36
(mean)	6.84	2.038	2.191	1.276

length of its duct. The length of bursa and its ductus reaches only two thirds of the length of the diverticulum.

The vas deferens curves around the vagina, and thickens slightly and gradually ascending to the epiphallus. The epiphallian flagellum has a length of 1.8 mm, and is shorter and wider than the epiphallus. The caecum is very small and inconspicuous. The dimensions of the penis are similar to those of the epiphallus. The appendix is shorter and thicker than the penis, and is continued distally by a long, unciform flagellum. The penial retractor is shorter than the appendicular retractor. Both retractors unite to a common muscle, inserting at the diaphragma. The atrium is minute.

The reproductive organs of the second specimen (n° 3745, fig. 5) differ mainly by the ♂ system. The epiphallian flagellum has a length of 3.0 mm, and is nearly twice as long than in the former specimen. The penis is twice as thick than the epiphallus, and its retractor is slightly longer than the appendicular retractor.

Localities. — Negev: Har 'Arif 957 m, on a stony desert slope (type-locality), leg. J. WAHRMAN 4. 12. 1949 and J. HELLER 17. 12. 1969. Nahal Timna near Eilat, 2. 11. 1950, 1 paratype (collector unknown). Makhtesh Ramon, Trias, leg. J. HELLER 31. 12. 1969, 8 paratypes.

Sinai: Gebel Sarbal, leg. A. HAIM 30. 6. 1968, 6 paratypes. Gebel Tarbush 1300 m (fig. 6), leg. A. HAIM 1. 9. 1968, 7 paratypes.

Shells of *B. sinaiensis* were found at Makhtesh Ramon, together with those of *Buliminus therinus* (BOURGUIGNAT), in front of a rodent burrow. *B. therinus* is easily distinguished by the granulated striae of its shell.

### ***Buliminus (Buliminus) negevensis* n. sp.**

(Figs. 2, 3, 6).

Holotype (*Buliminus* n° 3415) and 22 paratypes (n° 3409-3431) in moll.-coll., Hebrew University of Jerusalem, Zool. Dept. (n° 3427, 3429 in SMF 199000/2).

Type-locality — Negev above Mezzad Zohar (17 km SE Arad, 3½ km W Dead Sea shore) 100 m below sea level (35°20' E, 31°9' N or 18300616 Israel grid).

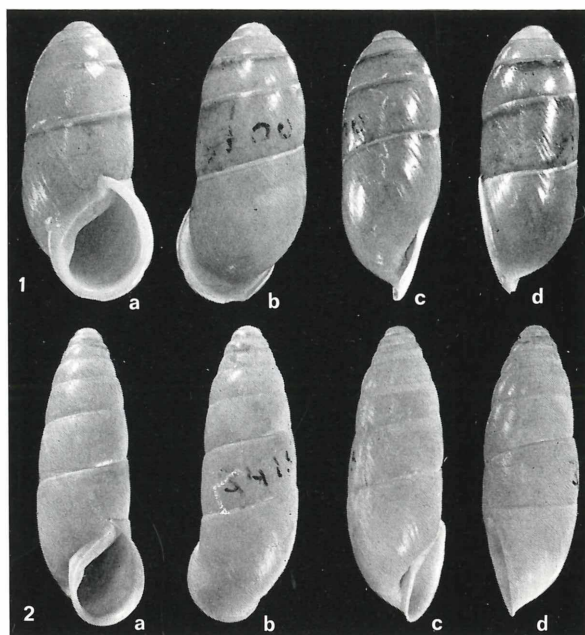


Fig. 1. *Buliminus (Buliminus) sinaiensis* n. sp., Holotype N° 3700, from Har 'Arif, 1·8/1.

Fig. 2. *Buliminus (Buliminus) negevensis* n. sp., Holotype N° 3415, from Mezad Zohar, 1·8/1.

a) Front view, b) Back view, c) Left view, d) Right view.

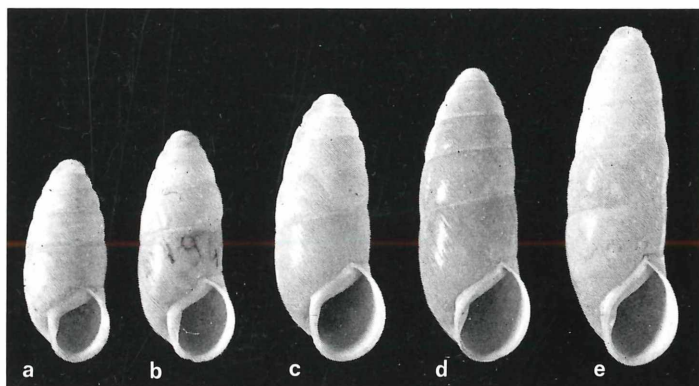
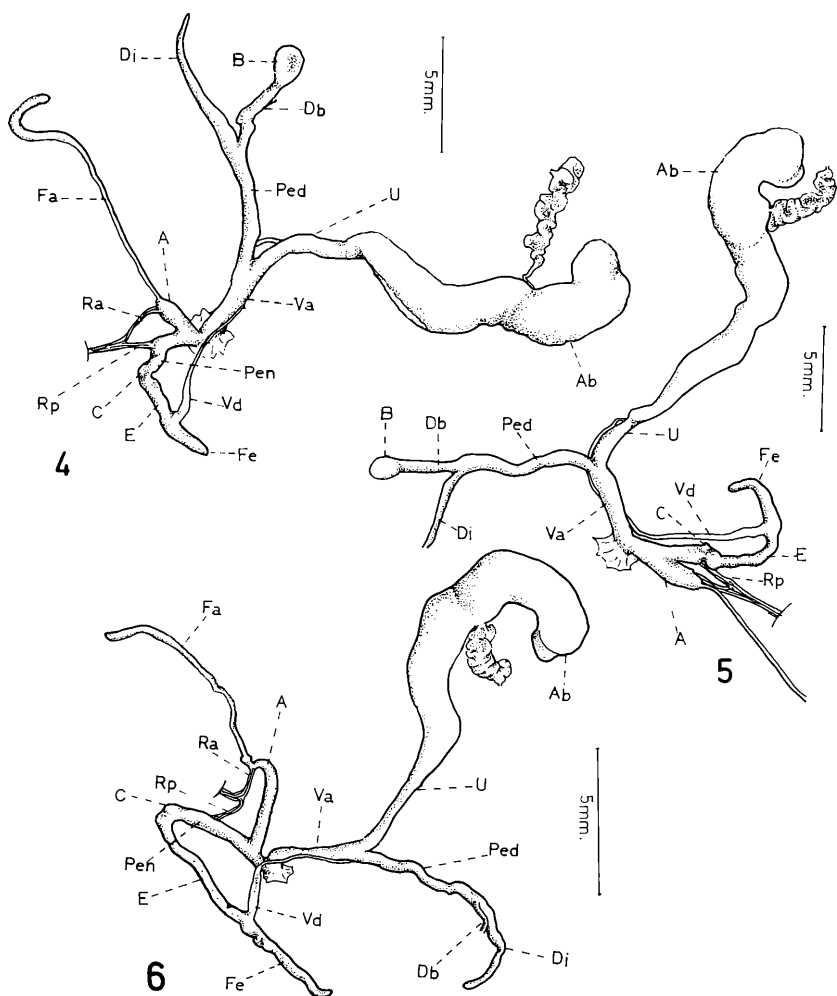


Fig. 3. *Buliminus (Buliminus) negevensis* n. sp., Paratypes. 2/1. — a) From Hamakhtesh Hagadol, b) from Ma'ale Aqrabim, c-e) from Mezad Zohar.



Reproductive system:

Figs. 4-5. *Buliminus (Buliminus) sinaiensis* n. sp., Paratypes N° 3744-5, from Har 'Arif.

Fig. 6. *Buliminus (Buliminus) negevensis* n. sp., Paratype (prep. A 51), from Hamakh-tesh Hagadol.

Abbreviations: *A* = Appendix of the penis, *Ab* = Albumen gland, *B* = Bursa of the receptaculum seminis, *C* = Caecum of the penis, *Db* = Ductus bursae of the receptaculum seminis, *E* = Epiphallus of the penis, *Fa* = Flagellum of the penial appendix, *Fe* = Flagellum of the penial epiphallus, *Ped* = Pediculus of the receptaculum seminis, *Pen* = Penis, *Ra* = Retractor of the penial appendix, *Rp* = Penial retractor, *U* = Uterus, *Va* = Vagina, *Vd* = Vas deferens.



Fig. 7. Gebel Tarbush, Sinai. Biotope of *Buliminus (Buliminus) sinaiensis* n. sp. Shells were collected on stony slope in foreground (Photo: A. HAIM).



Fig. 8. Hamakhtesh Hagadol, Negev. Biotope of *Buliminus (Buliminus) negevensis* n. sp.

Diagnose. — The shell of *B. negevensis* resembles that of *Ena* (*Ena*) *nogelli* (ROTH) (cf. FORCART 1940: pl. 1 figs. 3-4), but the reproductive organs differ by presence of a well developed epiphallian flagellum, typical for the genus *Buliminus*, and small in the genus *Ena* TURTON.

The shell of *B. negevensis* differs from the vaguely similar *Buliminus* (*Buliminus*) *carneus* (PFEIFFER) by the strongly developed callus, connecting the outer and inner lip.

It differs from *Buliminus* (*Buliminus*) *halepensis* (PFEIFFER) by its much slimmer width, and the relatively smaller aperture.

Description of shell (figs. 2, 3). — Shell dextrorsal, elongate, usually fragile, light brown, glossy, semitransparent. It is composed of 7-9 whorls. The protoconch consists of 2-2 $\frac{1}{4}$  smooth whorls. The other whorls are distinctly striated. The first  $\pm$  4 whorls increase rapidly in height and diameter, and form the apex of the shell. The last 3-4 whorls increase slowly in height, but hardly in diameter. All whorls, except the penultimate are convex. The suture is impressed. The aperture is elongate, its height is less than half the height of the shell. The outer and the inner lips are connected by a strong callus. The peristome is white, thin, slightly reflexed backwards.

Table 2: Measurements and ratios of *Buliminus* (*Buliminus*) *negevensis*.

	Shell Height	Max. Diam.	Min. Diam.	Mouth Height
holotype (No. 3415)	21.5	8.3	6.9	7.8
22 paratypes (range)	17.7-23.2	7.0-9.0	6.1-6.9	6.2-7.8
(mean)	20.04	7.7	6.50	6.98

	Mouth Diam.	Shell Height Max. Diam.	Shell Height Mouth Height	Mouth Height Mouth Diam.
holotype (No. 3415)	5.6	2.59	3.04	1.39
22 paratypes (range)	4.6-5.6	2.31-2.97	2.60-3.18	1.30-1.50
(mean)	5.02	2.605	2.867	1.391

Reproductive organs (fig. 6). — No live specimens were found at the type-locality. A specimen (preparation n° A 51; fig. 3), found alive at Hamakhtesh Hagadol was dissected for examination of the reproductive organs.

The albumen gland is whitish, bent, and deeply grooved at its distal end. The pediculus of the receptaculum seminis is slightly longer than the diverticulum. At its insertion in the vagina it is as thick as the uterus. When dissecting, a part of the ductus bursae and the bursa have been lost. The distal part of the vagina is slightly swollen.

The part of the vas deferens descending along the vagina is thin, that ascending along epiphallus becomes abruptly much thicker. The epiphallian flagellum is slightly longer and, at its base, slightly thicker than the epiphallus. The penis is shorter and thicker than the epiphallus. A slight swelling is the only trace of a caecum. The appendix equals in size the penis. It inserts the penis near its pro-

ximal end. The appendicular flagellum is twice as long as the appendix. The penial and appendicular retractors equal in length. Both unite to a common retractor muscle, inserting at the diaphragma.

**Taxonomy** — The long, slim contour of the shell suggests to add *B. negevensis* to the subgenus *Pene* PALLARY, 1929. *Pene* is characterized by its protoconch, forming a prominent nipple at the top of the apex, and by the penial- and appendicular retractors, not joining to a common muscle (cf. HESSE 1933: 192). In *negevensis* the whorls of the protoconch form the continuation of the other apical whorls; and the penial and appendicular retractors join to a common muscle. So we must ascribe *B. negevensis* to the subgenus *Buliminus* s. str.

*Buliminus (Buliminus) therinus* (BOURGUIGNAT), being quite frequent in southern Israel, differs by the granulated striae of its shell.

**Localities.** — Negev: Above Me'ad Zohar, —100 m, on a stony desert slope (type-locality), leg. J. HELLER 1. 4. 1970. Ma'ale Aqrabbim, leg. J. WAHRMAN 24. 3. 1943, 9 paratypes. Hamakhtesh Hagadol outlet, leg. H. ZINNER 30. 1. 1969, 9 paratypes. Har Avnon, leg. J. HELLER 16. 2. 1970, 20 paratypes.

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