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Selective predation on *Monacha haifaensis* (Mollusca: Gastropoda) by *Crocidura suaveolens* (Mammalia: Insectivora).

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Abstract

Additional cases of predation on landsnails by the Lesser white-toothed shrew *Crocidura suaveolens* are reported from Israel. According to the new information this shrew carries out selective predation on *Monacha haifaensis*.

Key words: Mollusca, Gastropoda-Pulmonata, predation, *Cocidura*, Israel.

Zusammenfassung

Monacha haifaensis - bevorzugte Beute von *Crocidura suaveolens.*
Landschnecken zählen zum Nahrungsspektrum der Gartenspitzmaus (*Crocidura suaveolens*) in Israel. Hier wird über die gezielte Bevorzugung der Haifa-Kartäuserschnecke (*Monacha haifaensis*) berichtet.

White-toothed shrews (*Crocidura*-spec.) are commonly encountered in the Mediterranean part of Israel (MENDELSSOHN & YOM-TOV 1987a, SHALMON 1993). The specific status of these variable shrews has recently been cleared by cytotaxonomical means (CATZEFLIS & al. 1985). They reached the conclusion that only one species of White-toothed shrew is living in Israel: the Lesser white-toothed shrew *Crocidura suaveolens*. This opinion has been confirmed or accepted by other specialists (VOGEL & al. 1990 with many additional references; SHALMON 1993), but has not yet been implemented in the important works by MENDELSSON & YOM-TOV (1987a,b). They still differentiate between two species *Crocidura suaveolens* and *Crocidura russula*, although the latter is confined in its distribution to Western Europe.

The Lesser white-toothed shrew is a well known predator of landsnails in Israel (MIENIS 1992, 1993). So far nine species of landsnails belonging to three families could be registered as prey species. They are enumerated in table 1.

Table 1: Systematic list of landsnails preyed upon by the Lesser white-toothed shrew *Crocidura suaveolens* in Israel (nomenclature after MIENIS & ORTAL 1994).

Family Buliminidae (= Enidae)
Euchondrus septemdentatus (ROTH 1839)
Euchondrus spec. (= *E. ovularis* auct. non OLIVIER 1801)
Family Helicidae
Eobania vermiculata (MÜLLER 1774)
Cornu aspersa megalostoma (BOUGUIGNAT 1864)
Helix engaddensis BOUGUIGNAT 1852
Theba pisana (MÜLLER 1774)
Family Hygromiidae
Xeropicta vestalis joppensis (SCHMIDT 1855)
Monacha obstructa (PFEIFFER 1842)
Monacha haifaensis (PALLARY 1939)

From the information published up till now it is not clear whether *Crocidura suaveolens* is a general predator of landsnails, eating any snail it can catch, or that it prefers a certain species in particular.

In May 1995 I had the opportunity to study this problem when snail-eating shrews were encountered in wasteland at the edge of the cottonfields of Kibbutz Netzer Sereni near the Nesher-Ramla sewage reservoir.

Description of the site

In the second half of May a nest of *Crocidura suaveolens* was found under a disgarded iron shutter in a patch of waste-land east of the cottonfields of Kibbutz Netzer Sereni, near the Nesher-Ramla sewage reservoir.

The area consists of heavy alluvial soil partly covered by some hardy weeds. This vegetation is dominated by the perennials *Prosopis farcta, Alhagi maurorum* and *Sorghum halepense*, and annuals like *Amaranthus* spec., *Tribulus terrestris, Chrozophora tinctoria, Abutilon theophrasti, Lavatera punctata, Heliotropium suaveolens, Conyza* spec., *Xanthium* spec. and *Scolymus hispanicus* (nomenclature after FEINBRUN-DOTHAN & DANIN 1991).

According to data accumulated between 1971 and 1995 nine species of landsnails are known to live in or near this wasteland: *Euchondrus septemdentatus, Eopolita protensa jebusitica, Daudebardia saulcyi, Deroceras berytensis, Helix engaddensis, Caracollina lenticula, Xeropicta vestalis joppensis, Monacha obstructa* and *Monacha haifaensis.* The cottonfields are not inhabitated by snails due to the heavy annual load of herbicides and insecticides they recieve.

Material, methods and results

Nibbled shells of predated snails were found near the nest entrance of a pair (?) of *Crocidura suaveolens* and in several other concentrations underneath two disgarded iron shutters of a former direct connection to the Yarqon-Negev water carrier.
The site was cleared of all the broken shells on 23 May 1995. Freshly predated snail shells were collected on 25 and 29 May. Due to a malfunction of a nearby waterpipe the area became flooded on 30 May causing a premature termination of the survey. All the shells were sorted according to species, identified and counted. The results are presented in table 2.

Table 2: Snails predated upon by the Lesser white-toothed shrew *Crocidura suaveolens* in a waste-land near the Nesher-Ramla sewage reservoir.

species	23. 5. 1995	25. 5. 1995	29. 5. 1995	total
Helix engaddensis	1 juv	-	-	1
Monacha obstructa	4	-	3	7
Monacha haifaensis	204	32	87	323
Total	209	32	90	331

Discussion and conclusion

It is a pity that new data concerning predation of landsnails by the Lesser white-toothed shrew *Crocidura suaveolens* near the Nesher-Ramla sewage reservoir could be collected only for just one week. Yet the results of the survey turned out to be rather surprising.

Of nine species of landsnails known to occur in the study area only three were encountered among the nibbled shells: *Helix engaddensis*, *Monacha obstructa* and *Monacha haifaensis*. All had been recorded already previously as victims of *Crocidura suaveolens* in Israel (Table 1).

According to the data presented in table 2 the Lesser white-toothed shrew showed a clear preference for *Monacha haifaensis*: 323 nibbled shells out of a total of 331 belonged to that species. This is rather remarkable because in that particular waste-land *Monacha haifaensis* is outnumbered by *Monacha obstructa* at a rate of 1:1.3. While *Monacha haifaensis* was found clinging to the weeds and waterpipes well above the ground, *Monacha obstructa* was only encountered at ground level. Specimens of the latter were even observed adhering to the underside of the shutters where the accumulations of predated snails were found! In spite of the fact that *Monacha obstructa* was easier to catch, shells of that species constituted just over 2 % of all predated snails.

In the same study area both the Spur-winged plover *Hoplopterus spinosus* and the Stone curlew *Burhinus oedicnemus* are feeding exclusively on *Monacha obstructa* (MIENIS 1989, 1991). Both birds find their prey by sight, while the shrew is using either its sense of smell or touch to locate a snail.

One wonders whether the odour of *Monacha haifaensis* is more attractive to *Crocidura suaveolens* than that of *Monacha obstructa*. The same situation also exists between *Monacha haifaensis* and *Xeropicta vestalis joppensis*. Both species are often found clinging to the same plant in the study area, yet only nibbled shells of *Monacha haifaensis* were recovered. On the other hand it is also possible that *Monacha obstructa* produces an antifeediant making the snail unpalatable for predators with a well developed sense of smell.

The data presented in table 2 give also some information concerning the rate of predation. After cleaning the site 32 nibbled snails were found after two days and additional 90 snails after another 4 days. This results to a mean rate of predation of at least 20 snails within a period of 24 hours. This number might be even higher, if this shrew also ate parts of the victims on the spot where they were caught.

It remained unknown whether the predation of the snails was carried out by a single shrew or a whole family.

In summarizing the new data it is possible to state that in a waste-land near the Nesher-Ramla sewage reservoir the Lesser white-toothed shrew *Crocidura suaveolens* carried out selective predation on *Monacha haifaensis*. Snails were predated at a mean rate of 20 per 24 hours.

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