

# **Analysis of the Stomach Contents of the Lycian Salamander *Mertensiella luschani* (Steindachner, 1891) (Urodela: Salamandridae), Collected from Southwest Turkey**

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**Abstract.** - In this paper, the stomach contents of 116 specimens (39 males, 47 females, and 30 juveniles) from the Southwest Turkey *Mertensiella luschani* populations are analyzed. A total of 342 prey items were identified and their frequency of occurrence and percent of diet were tabulated. The majority of the diet consisted of Insecta (50.58%), and within Insecta, Coleoptera (65.32%) was the major order represented. In addition to insects, *M. luschani* feeds on Gastropoda (19.59%), Arachnida (16.08%), Myriapoda (8.57%), Clitelliata (3.50%) and Crustacea (1.75%).

**Key words.** - *Mertensiella luschani*, stomach contents, prey, southwest Turkey.

## **Introduction**

Nine subspecies of the Lycian Salamander, *Mertensiella luschani*, are distributed along the coast of Southwestern Turkey and on some islands (e.g., Kastellorizon, Meis, Kekova, and Karpathos) (Baran and Atatür, 1997; Başoğlu et al., 1994; Veith et al., 2001). These are *M. l. luschani* Steindachner, 1891, *M. l. helverseni* Pieper, 1963, *M. l. atifi* Başoğlu, 1967, *M. l. fazilae* Başoğlu and Atatür, 1974, *M. l. finikensis* Başoğlu and Atatür, 1975, *M. l. antalyana* Başoğlu and Baran, 1976, *M. l. basoglui*

Baran and Atatür, 1980, *M. l. billae* Franzen and Klewen, 1987, and *M. l. flavimembris* Mutz and Steinfartz, 1995. *Mertensiella luschani* is not dependent on water, it inhabits humid soils and crevices under the *Pinus brutia* forests, Mediterranean maquis, and open rocky areas. Its vertical distribution ranges between 15-1300 m.

Various studies have been done on *M. luschani* in terms of its taxonomy (Franzen et al., 2001), ecology (Klewen, 1991; Steinfartz and Mutz, 1998), and reproductive biology (Özeti, 1973; Özeti, 1980). The aim of

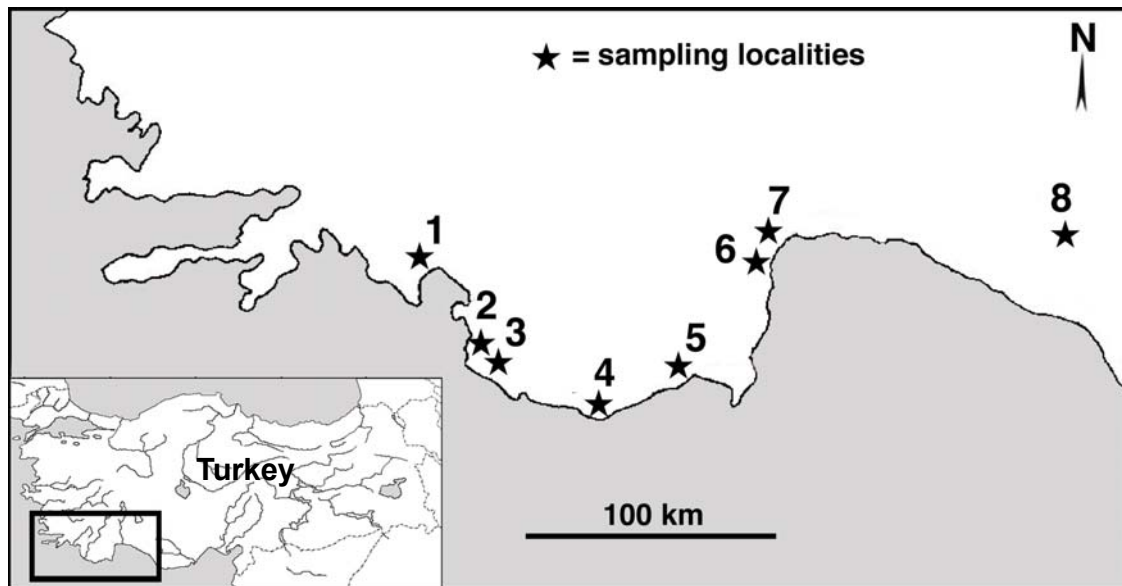


Figure 1. Collecting localities of *Mertensiella luschani* in Southwest Turkey. 1-Kocagöl, 2-Dodurga, 3-Letoon, 4-Nadalar, 5-Finike, 6-Büyükçaltıcak, 7-Hurma, 8-Fersin

Table 1. Composition of the stomach contents of *Mertensiella luschani* (39 males, 47 females, 30 juveniles) collected from the Southwest Turkey. **N**: The numbers of every prey found in all stomachs. **n**: The number of stomachs every prey type was found in.

<b>Taxon</b>	<b>N</b>	<b>(%)</b>	<b>n</b>	<b>(%)</b>
<b>GASTROPODA</b>				
Pulmonata	67	19.59	36	31.03
<b>CLITELLIATA</b>				
Neoglyphochaeta (=Prospora)				
Lumbricidae	12	3.50	9	7.75
<b>CRUSTACEAE</b>				
Isopoda	6	1.75	6	5.17
<b>MYRIAPODA</b>				
Diplopoda	1	0.29	1	0.86
Julidae	17	4.97	14	12.07
Chilopoda	8	2.34	6	5.17
Geophilidae	3	0.88	3	2.58
<b>ARACHNIDA</b>				
Aranae	37	10.82	27	23.27
Pseudoscorpionida (=Chelonethi)	18	5.26	15	12.93
<b>INSECTA</b>				
Collembola (=Podura)	4	1.17	3	2.58
Dermaptera				
Forficulidae	8	2.34	8	6.89
Isoptera	1	0.29	1	0.86
Heteroptera	4	1.17	5	4.31
Lygidae	3	0.88	1	0.86
Homoptera	1	0.29	1	0.86
Coleoptera	113	33.04	51	43.96
Hymenoptera				
Formicidae	31	9.06	19	16.37
Diptera	3	0.88	3	2.58
Lepidoptera	5	1.46	5	4.31

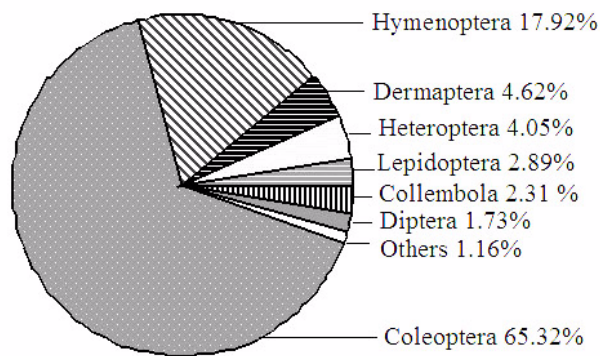


Figure 2. Distribution of the insect groups in numerical percentages.

the present preliminary investigation on seven *M. luschani* subspecies (except *M. l. flavimembris* and *M. l. helverseni*) from eight localities in Southwest Turkey is an analysis of stomach contents.

## Materials and Methods

Specimens for this study were collected from the eight localities in Southwest Turkey during the known activity period of *M. luschani* (December-February, 1999). A total 116 (39 males, 47 females, and 30 juveniles) *M. luschani* specimens were collected by hand under stones. Collection sites are shown in Figure 1.

Once collected, the salamanders were taken to the laboratory to undergo stomach-flushing. A thin pipe wash bottle is inserted in salamander's esophagus and stomach. Gentle pressure on the wash bottle forces distilled water in to the stomach and forces the food out through mouth (modified from Gittins, 1987). The prey items obtained from each specimen were labeled and stored in 10 cc. bottles containing 70% ethanol. Dried pieces from both undigested and partially digested prey were placed on microscope slides and held in place with cellophane tape (Düşen and Öz, 2001). These pieces

consisted of whole body, wings, thorax with abdomen, head, and mouth parts. Through this approach, identification to the lowest taxonomic categories was attempted, samples were examined using a stereomicroscope with 10-25x magnification. Prey items were identified and grouped utilizing methods described elsewhere (Demirsoy, 1998a,b; Grzimek, 1979a,b; Lodos, 1986; Riehm, 1984)

## Results

We did not observe any significant differences in the stomach contents of seven subspecies males, females and juveniles; they were thus evaluated together. Of the 116 specimens (39 males, 47 females, and 30 juveniles), only two females had empty stomachs. Small unrecognizable insect remains (parts of heads and larvae, antennae, wings, etc.) of the stomach contents are not included to the numerical analysis. Other non-food materials such as small pebbles, sand grains, plant particles, and pieces of feather, possibly ingested during prey capture were not included either.

A total of 342 prey items were counted from the investigated stomach contents (Fig. 2); Insecta 173 (50.58%), Gastropoda 67 (19.59%), Arachnida 55 (16.08%), Myriapoda 29 (8.57%), Clitellariata 12 (3.50%) and Crustacea 6 (1.75%). Table 1 presents the stomach contents with respect to prey groups (their taxonomic grouping, number of prey items, and percentages of preys).

Insects were identified to the ordinal level. The total number of prey and their percentages are as follow: coleopters 113 (65.32%), hymenopterans 31 (17.92%), dermapterans 8 (4.62%), heteropterans 7 (4.05%), lepidopterans 5 (2.89%), dipterans (1.73%), collembolan 4 (2.31%), homopterans 1 (0.57%), and isopterans 1 (0.57%) (Fig. 2). The same insect orders can be ranked from the viewpoint of the number of prey eaten; their percentages are as follows: coleopterans 51 (43.96%),

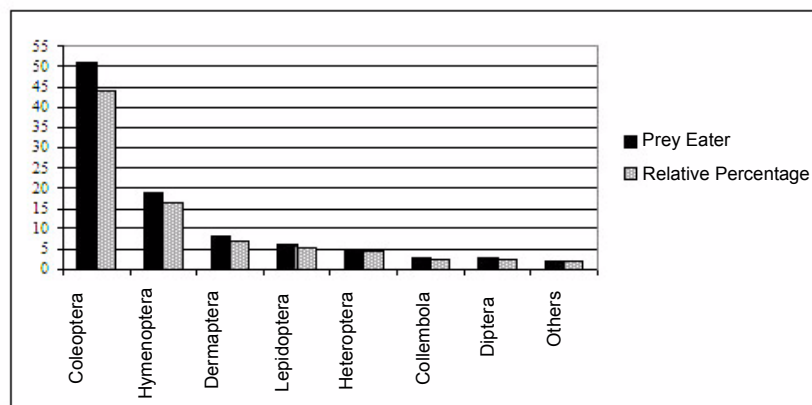


Figure 3. Distribution of the insect groups regarding prey eaters.

hymenopterans 19 (16.37%), dermapterans 8 (6.89%), heteropterans 6 (5.17%), lepidopterans 5 (4.31%), colembolans 3 (2.58%), dipterans 3 (2.58%), homopterans 1 (0.86%), and isopterans 1 (0.86%) (Fig. 3).

When the prey groups are evaluated by their absolute values and relative percentages within the food, coleopterans 51 (43.96%), have the priority. Other consumed invertebrates as follows: Pulmonata 36 (31.03%), Araneae 27 (23.27%), Pseudoscorpionida 15 (12.93%), Diplopoda 15 (12.93%), Clitelliata 9 (7.75%), Chilopoda 9 (7.75%), and Isopoda 6 (5.17%).

## Discussion

This study was conducted to learn more about the feeding preferences of *M. luschani* collected from southwest Turkey. The results showed that *M. luschani* feeds heavily on coleopters and gastropods.

The chance of a food item being taken depends on the abundance and ease of capture of the different food categories. Coleopters, although fairly fast moving are abundant in the foraging area. Gastropods and arachnids although easier to catch are slightly less abundant.

The results suggest that *M. luschani* is an opportunist predator on diverse forms. This situation is related to the type of habitat they live in and abundance of prey species in the vicinity.

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