# Sharing resources in a tiny Mediterranean island?
# Comparative diets of *Chalcides ocellatus* and *Podarcis filfolensis* in Lampione

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**Abstract.** The insular lizard microcommunity inhabiting the Lampione islet (Pelagian islands, S Italy) is constituted by a skink (*Chacides ocellatus*) and a lacertid lizard (*Podarcis filfolensis*). Their diet composition (taxa and sizes) during spring-early summer were analysed based on 131 faecal pellets, which could be individually assigned to a lizard species and sex (only in *P. filfolensis*). The diet of *C. ocellatus* was biased towards hard prey of medium to large sizes (Coleoptera, insect larvae). *Podarcis filfolensis* displayed a more diverse prey spectrum including Formicidae, Coleoptera, insect larvae and minor prey not consumed by the skink, but restricted to the small items; differences between sexes were minimal. Both species were partially herbivorous. Evidence of cannibalism was found for *P. filfolensis* and *C. ocellatus* preyed upon *P. filfolensis*. Pseudocommunity analysis does not support community structure but instead points to convergence in trophic strategies between both species due to insular conditions. Evolutionary history, rather than resource partitioning, seems responsible for the moderate trophic overlaps recorded and even may explain why both species coexist under the harsh conditions of this tiny islet.

**Keywords.** Diet; *Chacides ocellatus*; *Podarcis filfolensis*; community ecology; islands; Lampione.

## INTRODUCTION

For decades, lizards have constituted fruitful model organisms for studies in community ecology, diet being the most studied ecological dimension (see review by Luiselli 2008). Many of the initial and current studies are focused on the most complex assemblages, namely those in tropical or desert areas (Arnold 1984; Pianka 1986; Vitt & Caldwell 1994; Vitt & Carvalho 1995; Vitt & Zani 1998; Vitt et al. 2000; Akani et al. 2002, amongst many others), where environmental stability could allow interspecific relationships promoting detectable community structure (Winemiller & Pianka 1990). In contrast, studies on lizard assemblages inhabiting temperate regions are less abundant (but see Pérez-Mellado 1982; Strijbosch et al. 1989; Pollo & Pérez-Mellado 1991; Carretero & Llorente 1993; Capula & Luiselli 1994; Carretero et al. 2006; Kuranova et al. 2005; Rouag et al. 2007). This is probably because these are composed of less species but also because abiotic restrictions of seasonal climates overcoming the role of species interactions would make community structure less expectable to appear (Barbault 1991). In fact, a recent meta-analysis concluded that lizards of most (80%) communities worldwide do not partition their food resources but are randomly organised in the trophic niche axis (Luiselli 2008). Instead, increasing evidence is demonstrating that the influence of evolutionary history on the lizard trophic traits is stronger than previously thought. Specifically, niche conservatism rather than species interactions accounts for many trophic differences between the community components (Brooks & McLennan 2002; Webb et al. 2002; Vitt et al. 2003; Vitt & Pianka 2005; Mesquita et al. 2007; Espinoza et al. 2008).

Within this context, lizards inhabiting small Mediterranean islands constitute an apparent paradigm of simplicity. On one hand, strong seasonality and impoverished trophic resources impose severe constraints to insular lizards (Pérez-Mellado & Corti 1993), higher than those in adjacent mainland, making lizard communities inhabiting Mediterranean islets extremely poor when compared to those on big islands or on the continent (Mylonas & Valakos 1990).

On the other hand, the exposition to less potential competitors and predators and subsequent increase in the conspecific density (Carretero 2004, 2006) may open new possibilities for enlarging trophic niche (Pérez-Mellado & Corti 1993; Carretero 2004). Nevertheless, evidence on lacertid lizards indicates that the ecological response to these shifted environmental pressures is not immediate and some evolutionary time is needed to develop profound trophic adaptations (Pérez-Mellado & Corti 1993; Carretero 2004). Literature on the diet of Mediterranean lizards in small islands is abundant but usually focused on a single species (reviewed in Van Damme 1999; Pérez-Mellado & Traveset 1999; Carretero 2004), studies at multispecies level being rare (Nouira 1983).

Here, the diet composition of a microinsular community constituted by two divergent lizard species is analysed during spring-summer considering both inter- and intraspecific variation and compared to other populations of the same species. Moreover, the hypothesis of community structure at the trophic level is specifically tested against the null hypothesis of random trophic overlap.

## MATERIAL AND METHODS

### Study area

Lampione (35°33'00"N–12°19'11"E) is a small islet located 17 km off the W coast of Lampedusa (Pelagian Islands) and 110 km off Tunisia, in the Channel of Sicily. The area is 0.021 km$^2$ and the maximum altitude is 36 m a.s.l. From a geological point of view, the islet is composed of dolomitised carbonates belonging to formations of the Tunisian offshore, and its definitive isolation from North Africa was since 18,000 years B.P. (Pasta 2002). The climate is arid, characterised by strong drought periods in summer and by an average annual rainfall lower than 300 mm. The vegetation is mainly dominated by halo-nitrophile perennial shrubs. The occurrence of a large colony of gulls causes a strong level of soil eutrophisation and nutrient imbalances, which allow the expansion of the nitrophile biannual *Malva veneta* Soldano, Banfi & Galasso, 2005 during the late spring on the top of the islet. Lampione is at present-day uninhabited, but late-Roman ruins document an early human presence, though probably only seasonal (Pasta & Masseti 2002). The invertebrate assemblage of the islet reflects several features typical of microinsular and arid environments, namely a low number of species (about 30, excluding flying insects; Lo Cascio 2004, Lo Cascio unpublished), an over-representation of some groups (e.g., five species of Coleoptera Tenebrionidae; Canzoneri 1972; Lo Cascio unpublished), some being found at extremely high densities.

### Study lizards

Two lizard species inhabit the islet: the Maltese wall lizard, *Podarcis filfolensis* (Bedriaga, 1876), (Squamata: Lacertidae) and the Ocellated skink, *Chalcides ocellatus* (Forskål, 1775) (Squamata: Scincidae). The first is a genuine insular species endemic to the Maltese Archipelago and two Pelagian islands, Linosa and Lampedusa, where it is said to be introduced in early or recent time (Capula 2006; Lo Cascio & Corti 2008). The Ocellated Skink, *Chalcides ocellatus*, is widely distributed on the Sindian-Mediterranean area and is recorded for all the Pelagian islands (Turrisi & Vaccaro 2006); the origin of the islet population is probably related to the Pleistocene connections between Lampione and the nearby North-African mainland (see Grasso et al. 1985). The first data on the occurrence of such species in Lampione were reported by Lanza & Bruzzone (1961). Population density is extremely high for both species, only for *Podarcis filfolensis* being estimated using standard methods (7500–8000 individuals/ha, see Lo Cascio et al. 2006). From field observations, the ratio of apparent abundance between this species and *Chalcides ocellatus* was 3:1 approximately (Lo Cascio unpublished).

### Sampling and lab methods

Field sampling was carried out during several visits in late spring/early summer of 2004 and 2005, when both species show the peak of annual activity (Corti & Lo Cascio 2002). Faecal pellets were obtained from adult *Podarcis filfolensis* and *Chalcides ocellatus*; all the specimens were measured (snout-vent length, SVL) to the nearest 0.1 mm using a digital calliper, sexed (in *P. filfolensis*) and released back in the site of capture. Whereas adult *P. filfolensis* could be easily sexed in the field using sexual secondary characters (Corti & Lo Cascio 2002) and hemipenis eversion, the reduced external differences and the impossibility for analysing of internal cloaca did not allow identifying the sexes of *C. ocellatus* in field (see Badir 1959; Capula & Luiselli 1994).

The faecal contents were examined under stereoscopic microscope (10–40X). Remains were identified to Operational Taxonomy Units (OTUs) approximated here to the order/family level. Item counting was based on cephalic capsules, wings and legs, following the minimum numbers criterion by sample. When possible, prey lengths were obtained measuring the remains with a micrometer eyepiece and calculated by using regression equations (Hódar 1997) and then assigned to classes of 5 mm in length.

**Statistical methods**

Three diet descriptors were used: the percentage of pellets containing an OTU (%P), the percentage of numeric abundance of each OTU (%N), and the use index (IU) (Jover 1989); the latter is preferred because combines %N and %P; the importance of a certain OTU in the diet being estimated by calculation of the homogeneity of its consumption throughout all the individual contents (Carretero 2004). Brillouin's index was used to estimate the diet diversity according to Magurran (2004). For a given sample, the average individual diversity (Hi) was obtained by averaging the diversity values of each pellet whereas the (asymptotic) population diversity (Hp) was estimated through jack-knife resampling (Jover 1989, Magurran, 2004), that is, recalculating the total diversity missing out each sample in turn and generating pseudovalues, which are normally distributed. Whereas Hi and Hp have standard errors and allow statistical inference, the total accumulated diversity (Hz) of all pellets is a fixed value only provided for comparing with the literature (Ruiz and Jover 1981).

Overlap between diets was evaluated by means of the Pianka's index (Pianka 1973) applied on the IU values of OTUs and size classes (Carretero et al. 2006) using the Ecosym software (Gotelli & Entsminger 2004). Hypothesis of non-random similarity (Gotelli & Graves 1996) was tested using the RA2 (niche breadth relaxed / zero states retained) and RA3 (niche breadth retained / zero states reshuffled) Monte Carlo randomisation algorithms (Winemiller & Pianka 1990) generating 1000 pseudomatrices considering each OTU equiprobable.

Normality (Lilliefors test) and homoscedasticity (Fisher test) were assured prior to the application of parametric tests. Individual diversity and number of prey per pellet were compared using one-way ANOVA. Population diversity estimations obtained through jack-knife could not be compared using ANOVAs since the software provides only mean±SE and diversity is non-additive (Carretero & Llorente 1993). Instead, t-tests corrected for multiple tests (using False Discovery Rate, FDR, Benjamini & Hochberg 1995) were applied.

**RESULTS**

Pellets were obtained from 45 *C. ocellatus* and 86 *P. filfolensis* (58 males and 28 females). The SVLs in mm, mean±SE (range) of such specimens were 104.02±2.26 (62.0–140.0) for *C. ocellatus*, 65.45±0.56 (54.0–72.0) for male *P. filfolensis*, and 60.00±0.53 (44.5–67.0) for female *P. filfolensis*, The skinks were, in fact, much bigger than the wall lizards which displayed slight sexual size dimor-

phism favourable to males (ANOVA $F_{2,128} = 267.58$, P < $10^{-6}$, Scheffé tests *C. ocellatus-P. filfolensis* males P < $10^{-6}$, *C. ocellatus-P. filfolensis* females P < $10^{-6}$, *P. filfolensis* males-females *P* = 0.05).

The number of prey items by pellet (Table 1) was similar between both species and between male and female *P. filfolensis* (ANOVA $F_{2,128} = 0.45$, P = 0.64). However, the taxonomic composition of the diet (Table 1) showed substantial interspecific differences, whereas intersexual differences within *P. filfolensis* were minor. Both species consumed important amounts of plant matter (IU = 41.61% in *C. ocellatus* and IU = 18.37% in *P. filfolensis*). Within *P. filfolensis*, males (IU = 22.55%) used this resource more than females (IU = 9.69%). Moreover, *C. ocellatus* also consumed seeds and fruits (IU = 18.31%) but *P. filfolensis* almost did not (IU = 1.24%).

Regarding the prey of animal origin (Table 1), the diet of *C. ocellatus* was strongly biased towards Coleoptera (IU = 24.95%) and only secondarily to insect larvae (IU = 7.79%). In contrast, the animal prey consumed by *P. filfolensis* were more evenly distributed between Formicidae (IU = 26.73%), Coleoptera (IU = 15.08%) and insect larvae (IU = 14.27%) with minimal differences between sexes. Interestingly, the diet of the Maltese wall lizard included some minor prey (Araneae, Pseudoscorpiones, Acarina, Homoptera, Malophaga) that were completely absent from the diet of the Ocellated skink. Overall, animal diet was very similar between male and female *P. filfolensis*, the latter consuming more Araneae and Heteroptera (Table 1). It is worth noting that tails of juvenile *P. filfolensis* were found in adult conspecifics (two in males and two in females) and also in *C. ocellatus* (also two).

Consequently, diet diversity (Table 2) was lower in *C. ocellatus* than in *P. filfolensis*, with no differences between males and females. This was true when considering either individuals (ANOVA $F_{2,128} = 9.93$, *P* < $10^{-4}$; Scheffé tests *C. ocellatus - P. filfolensis* males *P* = 0.0003, *C. ocellatus – P. filfolensis* females *P* = 0.0005, *P. filfolensis* males - *P. filfolensis* females *P* = 0.99) or populations (*C. ocellatus – P. filfolensis* males $T_{101} = 4.67$, P = 5∗$10^{-6}$, $P_{FDR}$ < $10^{-4}$; *C. ocellatus – P. filfolensis* females $T_{71} = 4.82$, P = 4∗$10^{-6}$, $P_{FDR}$ < $10^{-4}$; *P. filfolensis* males – *P. filfolensis* females $T_{84} = 1.59$, P = 0.06, $P_{FDR}$ = 0.06).

As to the size of the items consumed (Table 3), *C. ocellatus* ate bigger prey than *P. filfolensis* but males and females of the latter species did not differ (ANOVA $F_{2,178} = 20.81$, P < $10^{-6}$, Scheffé tests *C. ocellatus-P. filfolensis* males P < $10^{-6}$, *C. ocellatus-P. filfolensis* females *P* = 5∗$10^{-5}$, *P. filfolensis* males-females P = 0.94). The modal size class of *C. ocellatus* was 5–10 mm whereas

*P. filfolensis* was shifted to the 1-5 mm class. In fact, except in two females, pellets of *P. filfolensis* did not contain items larger than 10 mm. No significant correlation between prey and predator sizes was detected within each group although those *P. filfolensis* females eating the 10–15 mm prey were bigger than the rest (ANOVA $F_{2,35}$ = 5.35, P = 0.009; Scheffé tets: 1–5 mm – 5–10 mm *P* = 0.86, 1–5 mm – 10–15 mm *P* = 0.01, 5–10 mm – 10–15 mm P = 0.01).

Finally, diet overlaps (Table 4) calculated from both taxonomical and size classification of prey were very similar, attaining moderate values between species but high values between male and female *P. filfolensis*. Pseudocommunity analysis at species level revealed that taxonomical overlap was higher than simulated in the RA3 matrix (niche breadth retained, *P* = 0.02) but similar to the RA2 matrix (zero states retained, *P* = 0.50). When considering the three classes (*C. ocellatus*, male and female *P. filfolensis*) none of the two algorithms indicated significant deviations from random. No significant differences were either detected for the size overlap.

## DISCUSSION

Differences in lizard diet arise from multiple factors including anatomy, sex, reproductive state, body condition, experience, prey availability, predation pressure, competition and evolutionary history (Schoener 1974; Dunham 1980; Pianka 1986; Losos 1992; Vitt & Zani 1998; Vitt et al. 1999; Perry & Pianka 1999; Pitt & Ritchie 2002; Carretero 2004). In Lampione, the manifest size differences between both species constitute the most obvious constraint for the prey they consume. Within species, prey sizes tend to follow a logarithmic distribution, small individuals simply not been able to consume the biggest items of the prey spectrum of the large individuals (Pianka 1986). However, between species this pattern can be altered if drastic divergence in anatomy or foraging tactics occurs (Carretero 2004). This seems to be the case, since *C. ocellatus* not only consumed large prey inaccessible for *P. filfolensis* as expected, but also kept the same number of prey items but biased to medium sizes. This result suggests that both species may follow different foraging strategies (Perry & Pianka 1999). In fact, *C. ocellatus* is described a semi-fossorial, sit-and-wait forager in plant litter or under stones (Arnold 1984; Capula & Luiselli 1994; Kalboussi & Nouira 2004; Lo Cascio et al. 2008) whereas *P. filfolensis* as most lacertids actively forages on the surface (Corti & Lo Cascio 2002; Bombi et al. 2005; Lo Cascio et al. 2006). Nevertheless, there is also evidence for anatomical constraints, since ocellated skinks consumed more hard prey (Coleoptera) than the wall lizards. In lacertids, large species tend to consume more

Coleoptera (Carretero et al. 2006) and there is experimental evidence for inter- and intraspecific differences in bite force for prey crashing associated with the jaw muscle mass (Herrel et al. 1999, 2001). Nonetheless, sexually dimorphic lacertid heads, as intersexual differences in bite force, primarily derive from sexual selection (Herrel et al. 1999; Kaliontzopoulou et al. 2007), and dietary shifts (minimal in *P. filfolensis*) should be interpreted as a by-product.

While divergent anatomy, foraging tactics and habitat use between both species accounted for a substantial part of the interspecific variation found, comparison with other populations indicates that other factors modified the taxonomic composition of their diets. As other insular lacertids in the Mediterranean (Pérez-Mellado & Corti 1993; Carretero et al. 2001; Corti et al. 2008), *P. filfolensis* consumed great amounts of ants not only in Lampione but also in Linosa (Sorci 1990; Bombi et al. 2005) and Lampedusa (Lo Cascio & Corti 2008). Since only *Podarcis* populations inhabiting ancient Mediterranean islands (i.e. Balearics, Mylos) are myrmecophagous, this has been interpreted as a result of long term evolution in insularity (Pérez-Mellado & Corti 1993; Carretero 2004). The decrease in predation pressure, the scarcity of alternative resources, together with the gregarious behaviour and seasonal stability of this prey may compensate for its low profitability and noxiousness (Carretero 2004). Apparently, *C. ocellatus* has not been able to follow a similar strategy since neither continental nor insular populations are myrmecophagous (Capula & Luiselli 1994; Kalboussssi 2004; Lo Cascio & Corti 2008). Whether this is due to evolutionary constraints or to recent colonisation of Lampione currently remains under debate.

Cannibalism and, in general, saurophagy seem also to increase in insular conditions due to the scarce resources and high lizard densities (Pérez-Mellado & Corti 1993; Carretero et al. 2001) as is the case of *P. filfolensis* and *C. ocellatus* (Scalera et al. 2004; Lo Cascio et al. 2006). However, the predation of *P. filfolensis* by *C. ocellatus* constitutes not only an additional food source but also an instance of direct, asymmetric interaction between both species (Chase et al. 2002).

As in the case of the ants, plants are also low profitable matter and their consumption seems to be restricted to old insular lacertid lineages which have developed behavioural and anatomical adaptations for herbivory (Pérez-Mellado & Corti 1993; Carretero 2004). Both *P. filfolensis* and *C. ocellatus* were partially herbivorous in Lampione. However, other populations of *P. filfolensis* studied also consumed substantial amounts of seeds, fruits and other plant remains (Sorci 1990; Bombi et al. 2005; Lo Cascio & Corti 2008) and even seed dispersal for some plant

species has been described in Linosa (Fici & Lo Valvo 2004). This suggests niche conservatism for herbivory in this species. In contrast, herbivory seems to be rare in *C. ocellatus*. Only two other microinsular populations, on Lampedusa and the Conigli islet (Lo Cascio & Corti 2008; Lo Cascio et al. 2008), were partially herbivorous, whereas, no or almost no plant remains were found in the populations from Sardinia (Capula & Luiselli 1994) and Tunisia (Kalboussi & Nouira 2004). Nevertheless, even continental ocellated skinks accept fruits in captivity (Schleich et al. 1996) suggesting certain exaptation for herbivory in this species. Comparing the *C. ocellatu*s population from Lampione with those from the other Pelagian islands (Lo Cascio & Corti 2008; Lo Cascio et al. 2008), there is an apparent trend for increasing the degree of herbivory with isolation and for decreasing it with island area.

The analysis of trophic diversity indicates that *P. filfolensis* is more euryphagous than *C. ocellatus*, with minimal intraspecific variation in the first. Remarkably, for both species, trophic diversity was much higher in populations than in individuals, indicating strong interindividual variation typical of generalist predators (Carretero et al. 2006). In fact, *C. ocellatus* displayed even stronger differences (4x) than *P. filfolensis* (3x), which is accordance with its sit-and-wait trend.

Finally, niche overlap summarises the trophic traits of the community previously exposed. Coincidence between taxonomical and size overlaps and higher values between species than within species indicate that intrinsical morphological constraints constitute the main force for the organisation of this microinsular community. Pseudocommunity analysis does not support community structure but instead points to enlarged, more overlapped trophic niches.

When compared to other conspecific populations, convergence in trophic strategies (herbivory, saurofagy) between both species due to insular conditions seems the more feasible hypothesis for explaining these results. Moreover, evolutionary history at both deep (foraging strategies, Vitt & Pianka 2005) and shallow (recent or ancient insular colonisation, see above) levels seems, rather than resource partitioning, responsible for the moderate trophic overlaps recorded and even may explain why both species coexist under the harsh conditions of this tiny islet. Nevertheless, coincidence of trophic overlap between two species with the direct predation of one on the other merits further analyses (see also Castilla 1995).

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## Appendix

**Table 1.** Descriptors of the taxonomic composition of the diet for *Chalcides ocellatus* and *Podarcis filfolensis* from Lampione island. OTU: Operational taxonomical unit, %P: percentage of presence; %N: percentage of numerical abundance; IU: Resource use index: – not consumed; 0.00: consumed but index value next to zero.

| OTU | *Chalcides ocellatus* total %P | %N | IU | *Podarcis filfolensis* total %P | %N | IU | *Podarcis filfolensis* males %P | %N | IU | *Podarcis filfolensis* females %P | %N | IU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gastropoda | 9.09 | 1.28 | 0.65 | 2.33 | 0.39 | 0.09 | – | – | – | 7.14 | 1.16 | 0.42 |
| Isopoda | 9.09 | 1.28 | 0.65 | 11.63 | 1.94 | 1.47 | 10.34 | 1.74 | 1.13 | 14.29 | 2.33 | 1.70 |
| Araneae | – | – | – | 12.79 | 2.13 | 1.68 | 5.17 | 0.87 | 0.35 | 28.57 | 4.65 | 5.10 |
| Pseudoscorpiones | – | – | – | 12.79 | 2.71 | 2.04 | 15.52 | 2.91 | 2.24 | 7.14 | 2.33 | 0.85 |
| Acarina | – | – | – | 2.33 | 0.39 | 0.09 | 3.45 | 0.58 | 0.15 | – | – | – |
| Diptera | 15.15 | 2.55 | 1.79 | 24.42 | 6.01 | 5.66 | 27.59 | 6.98 | 6.51 | 17.86 | 4.07 | 3.20 |
| Coleoptera | 66.67 | 18.30 | 24.95 | 55.81 | 12.40 | 15.08 | 56.90 | 12.21 | 14.98 | 53.57 | 12.79 | 16.48 |
| Hymenoptera | – | – | – | 25.58 | 7.56 | 6.95 | 27.59 | 7.27 | 6.41 | 21.43 | 8.14 | 7.04 |
| Formicidae | 18.18 | 4.26 | 3.19 | 60.47 | 23.45 | 26.73 | 58.62 | 22.38 | 25.18 | 64.29 | 25.58 | 31.15 |
| Homoptera | – | – | – | 6.98 | 1.74 | 0.97 | 10.34 | 2.62 | 1.60 | – | – | – |
| Heteroptera | 6.06 | 0.85 | 0.27 | 17.44 | 3.49 | 2.90 | 13.79 | 2.33 | 1.75 | 25.00 | 5.81 | 5.25 |
| Mallophaga | – | – | – | 9.30 | 1.55 | 1.06 | 10.34 | 1.74 | 1.13 | 7.14 | 1.16 | 0.42 |
| insect larvae | 30.30 | 8.51 | 7.79 | 37.21 | 14.15 | 14.27 | 34.48 | 15.70 | 14.93 | 42.86 | 11.05 | 13.26 |
| Arth ind. | 9.09 | 1.70 | 0.78 | 9.30 | 1.55 | 1.06 | 5.17 | 0.87 | 0.35 | 17.86 | 2.91 | 2.47 |
| Squamata | 3.03 | 0.43 | 0.00 | 4.65 | 0.78 | 0.35 | 3.45 | 0.58 | 0.15 | 7.14 | 1.16 | 0.42 |
| seeds, fruits | 21.21 | 25.53 | 18.31 | 6.98 | 3.10 | 1.24 | 6.90 | 1.16 | 0.59 | 7.14 | 6.98 | 2.55 |
| other plant matter | 54.55 | 35.32 | 41.61 | 45.35 | 16.67 | 18.37 | 53.45 | 20.06 | 22.55 | 28.57 | 9.88 | 9.69 |
| Total (mean±SE) | 45 pellets, 235 items 5.91±0.83 items/pellet | | | 86 pellets, 516 items 5.19±0.34 items/pellet | | | 58 pellets, 344 items 5.16±0.38 items/pellet | | | 28 pellets, 178 items 5.25±0.70 items/pellet | | |

**Table 2.** Diet diversities of *Chalcides ocellatus* and *Podarcis filfolensis* from Lampione island. Numbers indicate mean±SE. Hi: individual diversity; Hp: population diversity; Hz: total accumulated diversity; all using Brillouin's index.

| Species (class) | N | Hi | Hp | Hz |
|---|---|---|---|---|
| *Chalcides ocellatus* (total) | 45 | 0.61±0.03 | 2.57±0.11 | 2.44 |
| *Podarcis filfolensis* (total) | 86 | 0.98±0.02 | 3.33±0.08 | 3.22 |
| *Podarcis filfolensis* (males) | 58 | 0.98±0.03 | 3.19±0.08 | 3.05 |
| *Podarcis filfolensis* (females) | 28 | 0.98±0.06 | 3.43±0.14 | 3.17 |

**Table 3.** Descriptors of the prey size composition of the diet for *Chalcides ocellatus* and *Podarcis filfolensis* from Lampione island. OTU: Operational taxonomical unit, %P: percentage of presence; %N: percentage of numerical abundance; IU: Resource use index: – not consumed; 0.00: consumed but index value next to zero.

| | *Chalcides ocellatus* total | | | *Podarcis filfolensis* total | | | *Podarcis filfolensis* males | | | *Podarcis filfolensis* females | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OTU | %P | %N | IU | %P | %N | IU | %P | %N | IU | %P | %N | IU |
| 0–5 mm | 32.14 | 24.62 | 19.09 | 80.00 | 67.24 | 68.92 | 73.68 | 64.10 | 64.41 | 100.00 | 73.68 | 78.66 |
| 5–10 mm | 85.71 | 58.46 | 69.63 | 84.00 | 31.03 | 31.08 | 84.21 | 35.90 | 35.59 | 83.33 | 21.05 | 21.34 |
| 10–15 mm | 17.86 | 7.69 | 5.31 | 4.00 | 1.72 | 0.00 | – | – | – | 16.67 | 5.26 | 0.00 |
| > 15 mm | 17.86 | 9.23 | 5.96 | – | – | – | – | – | – | – | – | – |
| Total (mean±SE) | 65 (of 235) items measured 7.42±0.51 mm | | | 116 (of 516) items measured 4.22±0.24 mm | | | 78 (of 344) items measured 4.29±0.27 mm | | | 38 (of 178) items measured 4.08±0.47 mm | | |

**Table 4.** Diet overlaps (Pianka's index) between the lizard species and classes from Lampione island considering the taxonomical and size composition of the prey consumed.

| | taxonomical overlap | size overlap |
|---|---|---|
| *C. ocellatus* (total) – *P. filfolensis* (total) | 0.54 | 0.63 |
| *C. ocellatus* (total) – *P. filfolensis* (males) | 0.54 | 0.64 |
| *C. ocellatus* (total) – *P. filfolensis* (females) | 0.53 | 0.50 |
| *P. filfolensis* (males) – *P. filfolensis* (females) | 0.97 | 0.97 |