

On the ecology and phenology of *Chalcides chalcides* (LINNAEUS, 1758) in Central Italy (Squamata: Sauria: Scincidae)

Zur Ökologie und Phänologie von *Chalcides chalcides* (LINNAEUS, 1758) in Mittelitalien
(Squamata: Sauria: Scincidae)

LORENZO RUGIERO

KURZFASSUNG

Die vorliegende Arbeit präsentiert neue Daten zur Phänologie, Fortpflanzung und Ernährung von *Chalcides chalcides* (LINNAEUS, 1758) aus Mittelitalien. Im Freiland war die Aktivität der Echse im Frühjahr höher als im Sommer oder Herbst, was wahrscheinlich mit der verstärkten grabenden Lebensweise dieser Art nach dem Ende ihrer Paarungszeit zusammenhängt. Die Weibchen brachten einmahl im Jahr 4 bis 9 Junge zur Welt. Die Wurfgröße war positiv mit der mittlerlichen Kopf-Rumpflänge korreliert. Die Nahrung bestand fast ausschließlich aus bodenlebenden Arthropoden. Spinnen waren dabei am häufigsten vertreten; sie machten über 40 % der Anzahl der Nahrungsobjekte aus.

ABSTRACT

This paper presents new data on phenology reproduction and diet of *Chalcides chalcides* (LINNAEUS, 1758), from Central Italy. Lizards were more active in the open during spring rather than during summer or autumn, being probably depending on an increase of the fossorial habits of this species after the end of the mating season. Females produced litters of 4-9 young, once per year. Clutch size was positively correlated with maternal snout vent-length. Diet was composed almost only of ground dwelling arthropods. Spiders were the most frequent prey, accounting for over 40 % of the total number of prey items.

KEY WORDS

Chalcides chalcides; ecology, phenology, reproduction, diet; Central Italy, Mediterranean environment.

INTRODUCTION

Chalcides chalcides (LINNAEUS, 1758) is a common lizard in grassy places in the Italian Peninsula (BRUNO 1986). Despite its wide abundance in the Mediterranean area and the availability of detailed taxonomical and systematic studies on the genus *Chalcides* (e. g., CAPUTO & ODIERNA 1991; CAPUTO 1993; CAPUTO & al. 1993),

autecological data on *C. chalcides* are still relatively scarce, especially as far as the territory of Italy is concerned. The present study aims to be a preliminary contribution to the ecology of *C. chalcides* which could serve as a stimulus for further research on this very peculiar Mediterranean lizard.

MATERIALS AND METHODS

All data given here were collected in an agro-forest plain situated between the villages of Settebagni, about 15 km north-east of Rome (42°03'N; 12°35'E), and Tor Lupara, about 17 km east of Rome (42°N; 12°40'E), where already other studies on reptile ecology were done (e. g., CAPIZZI & al. 1995; RUGIERO & LUISELLI 1995). The

wooded area is represented by a coppice forest of *Quercus cerris*, *Q. robur*, *Ulmus minor*, *Fraxinus ornus*, *Laurus nobilis* and *Acer campestre*. The underbrush is composed of *Crataegus monogyna*, *Rosa canina*, *Prunus spinosa* and *Euonymus europaeus*. The woodland is surrounded by semi-cultivated fields with bushy zones of

Rubus ulmifolius, *R. idaeus*, *Spartium junceum* and *Robinia pseudoacacia*. The climate is typical Mediterranean, with concentrated rainfall in late autumn and winter, and a dry and hot summer (LUCCHESI & PIGNATTI 1990).

Four lizard species (*Lacerta viridis*, *Podarcis muralis*, *P. sicula*, *Anguis fragilis*), five snakes (*Vipera aspis*, *Coluber viridiflavus*, *Elaphe longissima*, *E. quatuorlineata*, *Natrix natrix*) and one tortoise (*Testudo hermanni*) inhabit the study area. *C. chalcides* is found in the grassy zones, even where anthropogenous influence is

high, but avoids woodland inners (RUGIERO, unpublished).

Data on fecundity and offspring size were obtained by capturing gravid females ($n=15$) in the field, and then housing them in terraria, where they were maintained until birth occurred. Reproductive data on each female were obtained and analyzed using the methods described in CAPULA & al. (1992), LUISELLI (1992), and LUISELLI & al. (1996 a, b). Trophic preferences were studied by analyzing the stomach contents of specimens which were found dead in the field.

RESULTS AND DISCUSSION

Phenology, annual cycle of activity, and reproduction

C. chalcides proved to be a strictly diurnal species (earliest and latest observation, respectively: 07.54 and 18.21). In the study area it is not found in the open before the second half of March, mates within the first half of May, and gives birth to young between end of July and first half of August. Its annual above-ground activity ends within the first half of October.

The mating period is characterized by male-male combats for access to females. During these combats, the males violently bite each other, displaying postures similar to those of the Slow Worm (*Anguis fragilis* LINNAEUS, 1758) (comp. MALKMUS 1995). In the study area, 41 sexual combats were observed from mid April to mid May.

The phenology of *C. chalcides* has characteristics rather unique amongst Central Italian lizards. In spring, both sexes were very active in the open, and, accordingly, their density appeared to be comparatively high. On the contrary, from beginning of July to the end of summer, occasionally found gravid females were the only *Chalcides* specimens in the open. From September to the beginning of hibernation, findings of these lizards became very rare. It is suggested that the fossorial habits of *C. chalcides* become more clearly expressed by late spring, concomitantly with the end of the sexual activity of the males.

Most of the gravid females were between 120 and 135 mm long (snout vent-

length) (fig. 1). Litter size varied between 4 and 9 and was slightly positively correlated with maternal snout vent-length (Pearson's $r = 0.45$, $n = 15$, $p = 0.09$) (fig. 2), while mean snout vent-length of offspring was not correlated with that of the mother ($r = 0.19$, $p > 0.1$).

Trophic preferences

106 prey items were obtained from the sample of 37 *C. chalcides*, (table 1). *C. chalcides* fed primarily upon small terrestrial arthropods, revealing some specialization. Spiders, contributed over 40% to the number of prey items, exceeding every other preyed taxon with regard to both

Table 1: Taxonomical diet composition of *Chalcides chalcides* from the study area in Central Italy, based on the analysis of the stomach contents of 37 different specimens.

Tab. 1: Taxonomische Nahrungszusammensetzung bei mittelitalienischen *Chalcides chalcides* aufgrund der Analyse der Mageninhalte von 37 Individuen.

| Prey Taxon Beutetiertaxon | n | n (%) |
|------------------------------|----|-------|
| Gastropoda Pulmonata | 1 | 0.94 |
| Isopoda | 16 | 15.09 |
| Araneae | 45 | 42.45 |
| Blattodea | 2 | 1.88 |
| Rhynchota Homoptera | 3 | 2.83 |
| Diptera | 3 | 2.83 |
| Coleoptera (adult) | 4 | 3.77 |
| Coleoptera (larvae) | 16 | 15.09 |
| Hymenoptera Apoidea | 1 | 0.94 |
| Hymenoptera Formicoidea | 5 | 4.71 |
| Unidentified / unbestimmt | 10 | 9.43 |

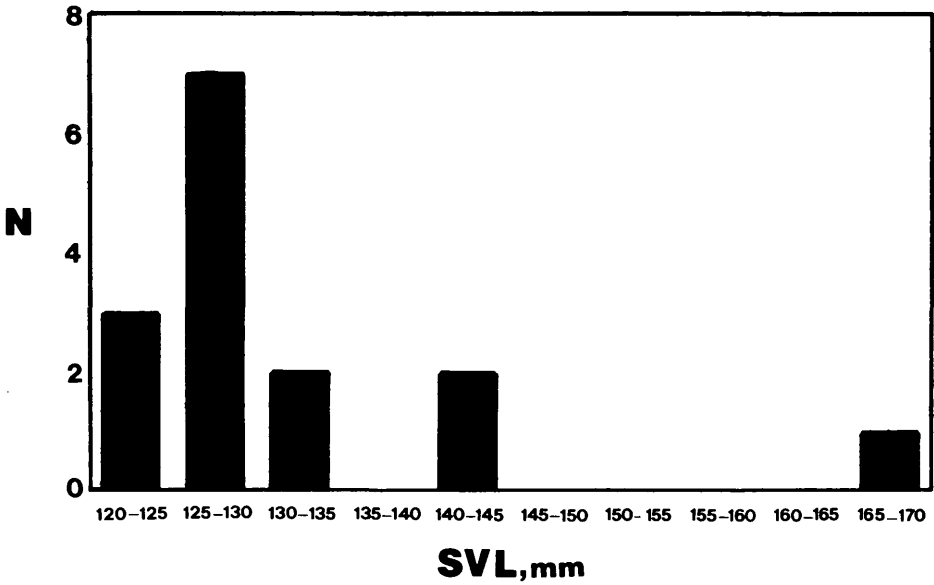


Fig. 1: Distribution of snout vent-length (SVL, mm) in the examined sample of gravid *Chalcides chalcides* (n=15) from the study area in Central Italy.

Abb. 1: Verteilung der Kopf-Rumpflängen (SVL, mm) im untersuchten Material trächtiger mittellitalienischer *Chalcides chalcides* (n=15).

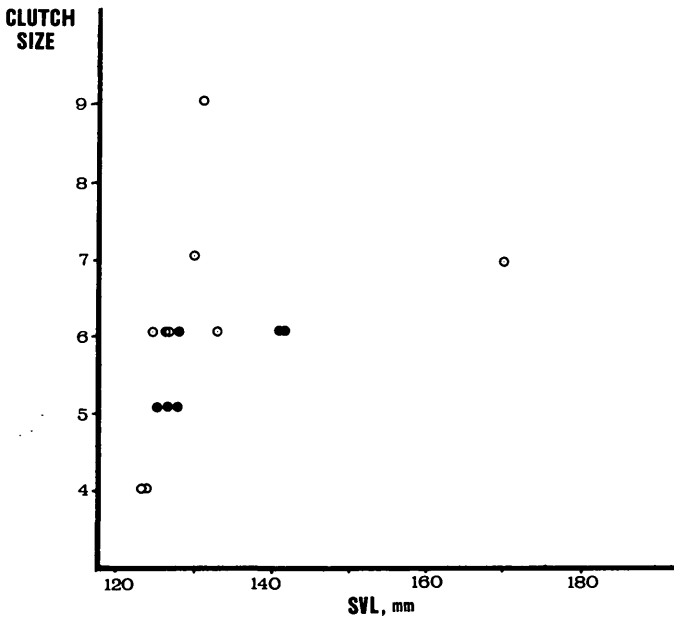


Fig. 2: Correlation between litter size and maternal snout vent-length (SVL, mm) in 15 *Chalcides chalcides* from the study area in Central Italy. Circles - specimens captured in 1994; black dots - specimens captured in 1995.

Abb. 2: Beziehung zwischen Wurfgröße und mütterlicher Kopf-Rumpflänge (SVL, mm) im untersuchten Material von *Chalcides chalcides* aus Mittelitalien (n=15). Kreise - Fänge aus 1994, schwarze Punkte - Fänge aus 1995.

relative frequency of occurrence in all stomachs (Chi-square test, $p < 0.01$), and relative frequency of occurrence in each of the stomachs (Chi-square test, $p < 0.05$). Isopods and beetle larvae were the only other taxa this lizard frequently preyed on. Flying insects (Diptera, Hymenoptera) formed a very small part of the diet.

C. chalcides body structure (fossorial, short-legged snake-like), and the ecological constraints (sensu BARBAULT & STEARNS 1991) resulting from this, could explain why flying insects are not frequently found in the stomach contents of *C. chalcides* and its congeners (e.g., CAPULA & LUISELLI 1994).

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Corresponding editor: Heinz Grillitsch

AUTHOR: Dr. Lorenzo RUGIERO, via Cimarosa 13, I-00198 Roma, Italia.

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