

# New data on the Peña de Francia Mountain Lizard '*Lacerta*' *cyreni martinezricai* ARRIBAS, 1996 (Squamata: Lacertidae)

Neue Angaben zur Peña de Francia Gebirgseidechse  
'*Lacerta*' *cyreni martinezricai* ARRIBAS, 1996  
(Squamata: Lacertidae)

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## KURZFASSUNG

Die Peña de Francia Gebirgseidechse (*L. cyreni martinezricai*) unterscheidet sich von anderen Formen ihrer Art (Gredos: *L. cyreni castiliana*, Guadarrama: *L. cyreni cyreni*) durch die signifikant verminderte Häufigkeit des Auftretens eines Schuppenkontaktes zwischen Rostrale und Internasale. Weiters zeichnen sich Männchen und Weibchen des Peña de Francia Taxons gewöhnlich durch blaue Ozellen in der Schultergegend und braune Rückenfärbung aus, während *L. cyreni* anderer Populationen keine Ozellen tragen und sehr häufig grünrückig sind. Neben diesen sehr auffälligen (und evolutiv bedeutsamen) Farbmerkmalen finden sich signifikante aber nicht sehr starke Pholidoseunterschiede (Anzahl Rückenschuppen-Längsreihen, Bauchschuppen-Querreihen, Circumanalschilder).

Das Vorkommen von *L. cyreni martinezricai* ist auf die Gipfelregion eines isolierten Berges begrenzt. Die Populationsgröße (~50 adulte Individuen) nimmt ständig ab. Schutzmaßnahmen sind dringend erforderlich.

## ABSTRACT

Peña de Francia Lizards (*L. cyreni martinezricai*) differ from other conspecifics (Gredos: *L. cyreni castiliana*, Guadarrama: *L. cyreni cyreni*) by the significantly reduced frequency of contact occurring between rostral and internasal shields. Furthermore, male and female Peña de Francia specimens usually bear blue ocelli in the shoulder region and are brown colored on the dorsum whereas the *L. cyreni* individuals of other populations lack ocelli and most frequently are green on their back. Apart from these very conspicuous (and evolutionary important) features, there are significant differences, however of minor degree, concerning the pholidosis (number of longitudinal dorsal scale rows, number of transversal ventral scale rows, circumanal shields).

*'Lacerta' cyreni martinezricai* is restricted to the summit region of an isolated mountain. The population size (~50 adult individuals) is in continuous decline. Conservation measures are urgently needed.

## KEY WORDS

Squamata: Lacertidae; *'Lacerta' cyreni*, *L. cyreni martinezricai*, *L. monticola*, *Podarcis hispanica*, *Timon lepidus*; Peña de Francia, Sistema Central, Iberian Peninsula, Spain

## INTRODUCTION

The presence of Cyrén's Lizard in the summit region of the Peña de Francia mountain (1710 m) was first described by KLEMMER (1957) on the basis of a male captured by A. EPPLE in September 1954. KLEMMER (l. c.) erroneously attributed the specimen to *Lacerta monticola cantabrica* MERTENS, 1929. This may be due to the specimen's blue ocelli, which are also typical to *L. monticola cantabrica* and *L. monticola monticola* BOULENGER, 1905. In 1979, MARTINEZ-RICA emended the confusion and stated that this lizard probably belonged to *L. monticola cyreni* MÜLLER & HELLMICH, 1937 (now *'Lacerta' cyreni*, see ARRIBAS 1996, 1997; ODIERNA & al. 1994, 1995, 1996; MAYER & ARRIBAS 1996).

The only further mention of the Peña de Francia taxon was in a paper by PEREZ-MELLADO (1982) dealing with morphology and biology of *L. monticola* in the western Spanish Sistema Central. In this publication data on various taxa of the area covered by his study appear to be merged (*L. monticola monticola* of Estrela, *L. cyreni martinezricai* of Peña de Francia and *L. cyreni* cf. *castiliana* from Bejar), and, thus, does not permit to draw clear conclusions on the Peña de Francia population studied here.

In 1996, within the framework of a revision of *L. monticola* and *L. cyreni*, the author of the present paper described the Peña de Francia population as *L. cy-*

*reni martinezricai* based on three preserved specimens (a male, a female and a young) and "further specimens examined but not preserved" (ARRIBAS 1996). The small sample size was severely criticized (PEREZ-MELLADO 1997; AHE 1998) although it was selected because of the extreme small-

ness of the range of this taxon.

The aim of this paper is to add more data on the morphology of this subspecies, based on pholidosis counts taken from the above-mentioned live specimens which will throw more light on the status of the population.

## MATERIALS AND METHODS

### Specimens studied

ARRIBAS (1996) studied 119 specimens (48 males, 71 females) of '*L.*' *cyreni* originating from the Spanish Sistema Central, including the three type specimens and 23 live specimens (13 males, 10 females) of the Peña de Francia taxon. The meristic data of these Peña de Francia specimens is presented here in detail. For the evaluation of biometric characters and indexes, in general, only specimens longer than 45 mm snout-vent length were used to avoid bias due to allometric effects. All preserved specimens are kept in the author's scientific collection (CA) at Universidad Autónoma de Barcelona (Barcelona, Spain). Specimens stored in Estación Biológica de Doñana (EBD, Sevilla, Spain) were also studied.

### Characters studied

In the Peña de Francia material, pholidosis data was taken from live specimens which had been captured by noose and released after the procedure. The results were compared to those found in the other subspecies of '*L.*' *cyreni* living in the Spanish Sistema Central (see ARIBAS 1996).

**Pholidosis (counts):** Supraciliar granulae (GRS) on right (r) and left (l) side; gularia along a median line (GUL); collaria (COLL); longitudinal series of dorsalia (DORS); transversal series of ventralia (VENT); femoralia (FEM) of right (r) and left (l) side; lamellae underneath 4th toe

(LAM); circumanalia (CIRCA).

**Scale contact:** Frequency and mode of rostral - internasal (= frontonasal) scale contact (ROST).

**Coloration:** Presence and number of blue ocelli.

### Statistical procedures

Statistical analyses performed in the present study are basically the same as in ARIBAS (1996, 1997).

**Univariate statistics:** Descriptive statistics (mean, standard deviation, coefficient of variation, minimum, maximum) were calculated for all meristic characters which were compared between populations by means of one-factor ANOVA. Wherever significant differences occurred among samples, Scheffé's post-hoc test was run. As sexual dimorphism was present in several features (see below), all calculations were done separately for males and females (see SOKAL & ROHLF 1969).

**Multivariate analyses:** MANOVA and Canonical Variate Analysis (CVA) were executed to describe global differences between populations. Minimum spanning trees (MST) based on squared Mahalanobis distances ( $D^2$ ) were calculated from the main samples (SNEATH & SOKAL 1973).

The following criteria were used to evaluate the distinctiveness of populations: (i) percentage of correct classification by the Canonical Variate Analysis, and (ii) number of significant differences in the Chi-square and ANOVA F values.

## RESULTS

### Sexual dimorphism

Three of the pholidosis characters studied in the Peña de Francia specimens prove to be sexually dimorphic: VENT ( $T_{118} =$

13.33,  $p < 0.0001$ ), FEM(r) ( $T_{118} = 2.79$ ,  $p < 0.01$ ), and FEM(l) ( $T_{118} = 3.03$ ,  $p < 0.05$ ). Frequency of rostral - internasal scale contact and presence/absence of blue ocelli do not differ significantly between sexes.

Table 1: Descriptive statistics on the pholidosis of 13 male and 10 female individuals of the Peña de Francia lizard ('*Lacerta cyreni martinezricai*). Std.dev. - Standard Deviation; CV - Coefficient of Variation; For measurement parameters see "Materials and Methods".

Tab. 1: Beschreibende Statistiken zur Pholidose von 13 Männchen und 10 Weibchen der Peña de Francia Gebirgseidechse ('*Lacerta cyreni martinezricai*). Std.dev. - Standardabweichung; CV - Variationskoeffizient; Parameter siehe "Materials and Methods".

Sex	Parameter	Basic Statistics / Statistische Kenngrößen				
		Mean/Mittel	Std.dev.	CV	Minimum	Maximum
Males/Männchen	GR(r)	11.3	1.97	0.174	6	14
	GR(l)	10.1	2.03	0.200	6	13
	GUL	25.2	1.83	0.072	23	28
	COLL	11.4	1.05	0.910	10	13
	DORS	53.0	1.97	0.037	50	57
	VENT	25.6	0.76	0.030	24	27
	FEM(r)	19.4	1.98	0.100	16	24
	FEM(l)	19.7	2.31	0.117	16	25
	LAM	24.6	1.50	0.061	22	28
	CIRCA	6.3	0.94	0.150	5	8
Females/Weibchen	GR(r)	10.8	2.14	0.200	7	13
	GR(l)	10.7	1.82	0.180	6	13
	GUL	24.7	1.49	0.060	22	27
	COLL	10.6	1.07	0.100	9	12
	DORS	50.4	2.27	0.045	46	53
	VENT	29.2	0.91	0.031	28	30
	FEM(r)	17.2	0.91	0.053	16	19
	FEM(l)	17.3	0.67	0.040	17	19
	LAM	24.0	1.49	0.060	22	26
	CIRCA	6.3	0.10	0.101	5	7

### Differences to other populations

Rostral-internasal scale contact: In males of the Peña de Francia population, these scales mostly lack contact ( $n = 8$ ) and more rarely contact only in one point ( $n = 3$ ) or broadly ( $n = 2$ ). These proportions are significantly different ( $\chi^2 = 28.06$ ,  $p < 0.0001$ ) and nearly totally con-

trary from those observed in males from Gredos (1, 1, 20) and Guadarrama (0, 1, 12) which almost always have contact among these plates. Female results are similar, in that these scales frequently lack contact ( $n = 5$ ), contact in one point ( $n = 3$ ) or contact broadly ( $n = 2$ ) in Peña de Francia specimens, whereas full contact is the usual situation in females of Gredos (2,

Table 2: Canonical Variate Analysis of three samples of male '*Lacerta cyreni*. Coordinates of the centroids, 95% confidence radii, and squared Mahalanobis distances between centroids are indicated.

Tab. 2: Kanonische Varianzanalyse dreier Stichproben männlicher '*Lacerta cyreni*. Angegeben sind die Centroidkoordinaten, die 95% Konfidenzradien und die Quadrate der Mahalanobisdistanzen zwischen den Centroiden.

Sample / Stichprobe	Axis 1 / Achse 1	Axis 2 / Achse 2	95% Confidence Radius / 95% Vertrauensradius
Guadarrama	1.33	1.09	1.20
Gredos	1.07	-1.17	1.04
Peña de Francia	-2.40	-0.08	1.45
Squared Mahalanobis Distances / Quadrate der Mahalanobisdistanzen			
Sample / Stichprobe	Guadarrama	Gredos	Peña de Francia
Guadarrama	0.00	5.19	14.90
Gredos		0.00	13.60
Peña de Francia			0.00

3, 31) and Guadarrama (3, 3, 15). The Peña de Francia population differs significantly ( $\chi^2 = 17.89$ ,  $p < 0.005$ ) from the other two samples.

**Blue ocelli:** Peña de Francia males show blue ocelli (12 out of 13 specimens seen) which completely lack in Gredos and Guadarrama males ( $\chi^2 = 12.64$ ,  $p < 0.005$ ). Females of the Peña de Francia population usually have also well developed blue ocelli in the shoulder region (seven out of ten specimens seen), whereas none of the Gredos or Guadarrama specimens studied shows them ( $\chi^2 = 38.65$ ,  $p < 0.0001$ ).

**Meristic characters:** The numerical values of the meristic characters of the Peña de Francia specimens are summarized in table 1 (for comparative data on other 'L.' *cyreni* populations see ARRIBAS 1996).

**Males:** For the characters below, the differences between the male Peña de Francia, Gredos, and Guadarrama populations are as follows [(-) = not significant]:

- DORS ( $F_{46, 2} = 4.49$ ;  $p < 0.05$ ).
- Peña de Francia - Gredos ( $p < 0.01$ )
- Peña de Francia - Guadarrama (-)
- Gredos - Guadarrama (-)
- VENT ( $F_{46, 2} = 9.96$ ;  $p < 0.0005$ ).
- Peña de Francia - Gredos (-)
- Peña de Francia - Guadarrama ( $p < 0.05$ )
- Gredos - Guadarrama ( $p < 0.01$ )
- CIRCA ( $F_{46, 2} = 19.77$ ;  $p < 0.0001$ ).
- Peña de Francia - Gredos (-)
- Peña de Francia - Guadarrama ( $p < 0.0001$ )
- Gredos - Guadarrama ( $p < 0.0001$ )

**Females:** For the characters below, the differences between the female Peña de

Francia, Gredos, and Guadarrama populations are as follows [(-) = not significant]:

- GRS(1) ( $F_{66, 2} = 3.30$ ;  $p < 0.05$ ).
- Peña de Francia - Gredos (-)
- Peña de Francia - Guadarrama (-)
- Gredos - Guadarrama ( $p < 0.05$ )
- GUL ( $F_{66, 2} = 4.47$ ;  $p < 0.05$ ).
- Peña de Francia - Gredos (-)
- Peña de Francia - Guadarrama (-)
- Gredos - Guadarrama ( $p < 0.05$ )
- DORS ( $F_{66, 2} = 11.49$ ;  $p < 0.0001$ ).
- Peña de Francia - Gredos (-)
- Peña de Francia - Guadarrama (-)
- Gredos - Guadarrama ( $p < 0.0001$ )
- VENT ( $F_{66, 2} = 11.20$ ;  $p < 0.0001$ ).
- Peña de Francia - Gredos (-)
- Peña de Francia - Guadarrama ( $p < 0.01$ )
- Gredos - Guadarrama ( $p < 0.001$ )
- CIRCA ( $F_{66, 2} = 24.40$ ;  $p < 0.0001$ ).
- Peña de Francia - Gredos (-)
- Peña de Francia - Guadarrama ( $p < 0.00001$ )
- Gredos - Guadarrama ( $p < 0.00001$ )

Canonical Variate Analysis

**Males:** MANOVA shows differences between populations studied ( $F_{22, 70} = 6.5304$ ,  $p < 0.0001$ ; Wilks' Lambda = 0.1443). The first two axes (eigenvalues 8.68 and 2.57, respectively) explain all interpopulation variance (77.1% and 22.9%). In its positive part, the first canonical axis separates the samples of Guadarrama and Gredos, characterized mainly by higher values of ROST (0.620) and lower of DORS (-0.267) from the Peña de Francia sample in the negative part, characterized by contrary scores in these characters.

The second axis separates Guadarrama and Gredos samples, with the Peña

Table 3: Canonical Variate Analysis of three samples of female '*Lacerta cyreni*'. Coordinates of the centroids, 95% confidence radii, and squared Mahalanobis distances between centroids are indicated.

Tab. 3: Kanonische Varianzanalyse dreier Stichproben weiblicher '*Lacerta cyreni*'. Angegeben sind die Centroidkoordinaten, die 95% Konfidenzradien und die Quadrate der Mahalanobisdistanzen zwischen den Centroiden.

Sample / Stichprobe	Axis 1 / Achse 1	Axis 2 / Achse 2	95% Confidence Radius / 95% Vertrauensradius
Guadarrama	1.70	-0.67	1.10
Gredos	0.21	1.15	0.80
Peña de Francia	-1.90	-0.48	1.59
Squared Mahalanobis Distances / Quadrate der Mahalanobisdistanzen			
Sample / Stichprobe	Guadarrama	Gredos	Peña de Francia
Guadarrama	0.00	5.53	13.00
Gredos		0.00	7.08
Peña de Francia			0.00

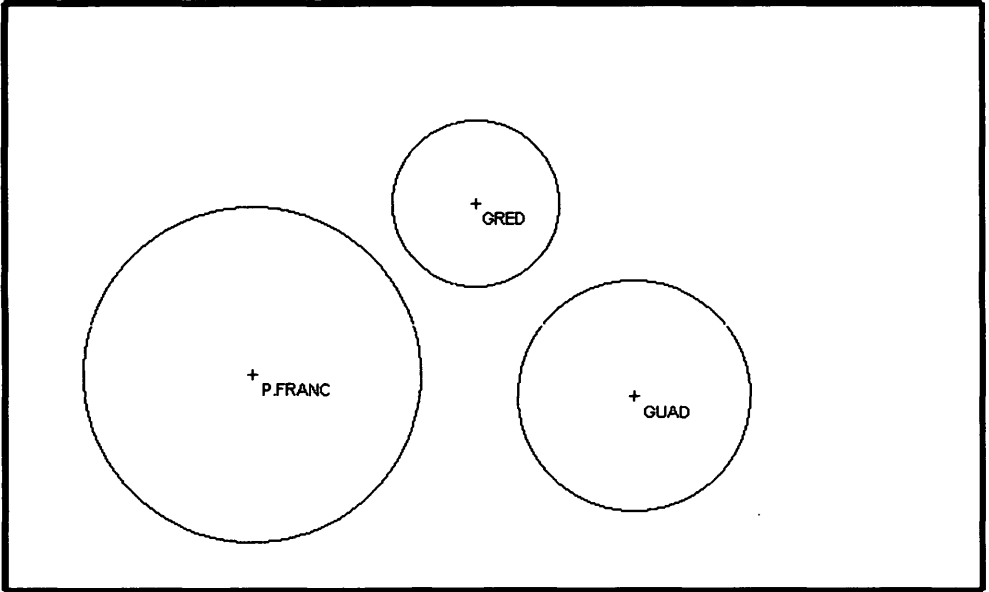


Fig. 1: Males of '*Lacerta cyreni*'. Graphic representation of the first two axes of the CVA of the pholidosis characters of three samples. Populations are described by their centroids (+) and 95% confidence spheroids. GUAD - Guadarrama; GRED - Gredos; P. FRANC - Peña de Francia.

Abb. 1: Männchen von '*Lacerta cyreni*'. Graphische Darstellung der ersten beiden Achsen der CVA der untersuchten Pholidosemerkmale dreier Stichproben. Die Populationen sind durch ihre Centroide (+) und 95% Konfidenzspären beschrieben. GUAD - Guadarrama; GRED - Gredos; P. FRANC - Peña de Francia.

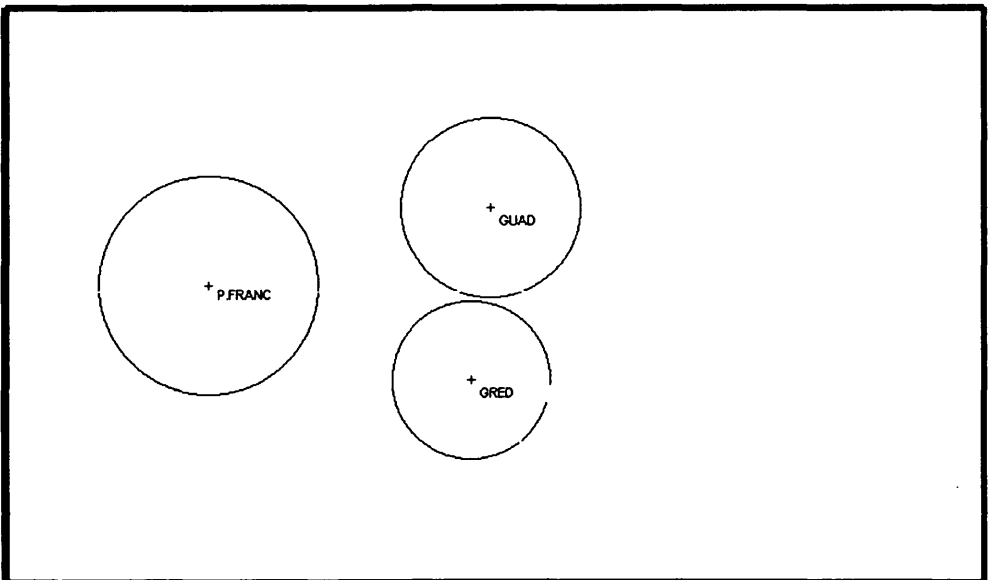


Fig. 2: Females of '*Lacerta cyreni*'. Graphic representation of the first two axes of the CVA of the pholidosis characters of three samples. Populations are described by their centroids (+) and 95% confidence spheroids. GUAD - Guadarrama; GRED - Gredos; P. FRANC - Peña de Francia.

Abb. 2: Weibchen von '*Lacerta cyreni*'. Graphische Darstellung der ersten beiden Achsen der CVA der untersuchten Pholidosemerkmale dreier Stichproben. Die Populationen sind durch ihre Centroide (+) und 95% Konfidenzspären beschrieben. GUAD - Guadarrama; GRED - Gredos; P. FRANC - Peña de Francia.

de Francia sample in an intermediate position. The Guadarrama population is placed in the positive part of the axis by its lower values of VENT (-0.632) and higher of CIRCA (0.421). For the coordinates of the centroids, the 95% confidence radia, and the squared Mahalanobis distances between centroids see table 2.

The first two canonical axes have strong discriminant power in that only 12.28 % of all male individuals analyzed are misclassified. Out of 19 Guadarrama males, two are misclassified, one as belonging to the Peña de Francia sample and one as belonging to the Gredos sample. Out of 25 Gredos specimens four are incorrectly classified as Guadarrama specimens. Finally, from 13 Peña de Francia males analyzed, only one is misclassified as belonging to the Gredos sample.

**Females:** As in males, MANOVA shows differences between the populations ( $F_{22, 116} = 5.4229$ ,  $p < 0.0001$ ; Wilks' Lambda = 0.2430). The first two axes (eigenvalues 6.55 and 1.99, respectively) explain the whole interpopulation variance (76.7 % and 23.3 %).

In its positive part, the first canonical

axis separates the samples of Guadarrama and Gredos, characterized by their higher values of CIRCA (0.655), ROST (0.378) and lower values of VENT (-0.345), from the Peña de Francia sample in the negative part, characterized by contrary scores in these characters.

The second axis separates the Gredos sample from both Peña de Francia and Guadarrama samples. Gredos is placed in the positive part of the axis by higher values of GUL (0.323), DORS (0.519), and ROST (0.467).

For coordinates of the centroids, 95% confidence radia, and squared Mahalanobis distances between centroids see table 3.

The two canonical axes have fairly good discriminant power, in that 19.72 % of all female individuals analyzed are misclassified. Out of 21 Guadarrama females, three are incorrectly classified as belonging to the Gredos sample. From 40 Gredos specimens six are misclassified as belonging to Guadarrama and three as belonging to Peña de Francia. Finally, out of 10 Peña de Francia females studied, one is erroneously classified as belonging to Gredos and one as belonging to Guadarrama.

## DISCUSSION

Already from its overall aspect, the Peña de Francia Rock Lizard is well distinguished by its blue ocelli in the shoulder region and its generally brown colored dorsum, which, however, makes some males appear very similar to those of *Podarcis muralis* (LAURENTI, 1768) (figs. 3 to 6). In the other populations of '*L.*' *cyreni*, green is the predominant dorsal color, yet brown individuals are present to a variable degree, de-

pending on the locality (figs. 9, 10). In these remaining populations, occurrence of blue ocelli is exceptional. I have not seen one case among almost one hundred individuals, but a specimen figured in GARCÍA PARIS & al. (1989) shows ocelli. Spatial isolation combined with the striking peculiarities in color-pattern are one reason to consider '*L.*' *cyreni martinezricai* an evolutive unit different from all other '*L.*' *cyreni*

Fig. 3 - 6 (opposite page) / Abb. 3-6 (gegenüberliegende Seite)

Fig. 3: '*Lacerta*' *cyreni martinezricai*. Male. The brown dorsal color and blue ocelli in the shoulder region make some specimens of this subspecies look very similar to male Wall Lizards (*Podarcis muralis*).

Abb. 3: '*Lacerta*' *cyreni martinezricai*. Männchen. Die Braunfärbung und die blauen Ozellen im Schulterbereich machen einige Exemplare dieser Unterart männlichen Mauereidechsen (*Podarcis muralis*) sehr ähnlich.

Fig. 4: '*Lacerta*' *cyreni martinezricai*. Female. Note the presence of blue ocelli as is in males.

Abb. 4: '*Lacerta*' *cyreni martinezricai*. Weibchen. Wie bei Männchen sind blaue Ozellen ausgebildet.

Fig. 5: '*Lacerta*' *cyreni martinezricai*. Male of a rare clear background color and with contoured blue ocelli.

Abb. 5: '*Lacerta*' *cyreni martinezricai*. Männchen von selten heller Rückenfarbe mit konturierten blauen Ozellen.

Fig. 6: '*Lacerta*' *cyreni martinezricai*. Male. The only green specimen seen shows also blue ocelli.

Abb. 6: '*Lacerta*' *cyreni martinezricai*. Männchen. Das einzige festgestellte grüne Exemplar trägt auch blaue Ozellen.



4 6



3 5







8 10



7 9





of the mountains of the Spanish Central System.

Pholidosis is another one. In most individuals of '*L. cyreni martinezricai*' the rostral and internasal plates are separated from each other or contact in a point, while in almost all other '*L. cyreni*' populations (Gredos and Guadarrama, in peculiar) these plates almost always contact broadly.

Meristic pholidosis parameters show minor differences among populations. Peña

de Francia specimens significantly differ from Guadarrama specimens ('*L. cyreni*' sens. str.) in the number of transversal ventral scale rows (males and females), circumanal plates (males and females), and (females only) longitudinal dorsal scale rows and supraciliar granules. The Peña de Francia specimens examined seem to have smaller masseteric plates than other populations, Gredos in peculiar (ARRIBAS 1996).

## CONSERVATION CONSIDERATIONS

The rough estimation (ARRIBAS 1996) of the size of the population of '*L. cyreni martinezricai*' consisting of about fifty individuals only, was of course given in order to illustrate its apparent scarcity and justify the low number of preserved type specimens. My estimation was based on visual prospecting during three trips (some twelve hours of total prospecting) through the small zone inhabited by the population.

Peña de Francia is an extremely steep mountain (like a truncated cone) the summit region of which (1723 m) is represented by a small plateau with a sanctuary (fig. 7). The lizard is restricted to the uppermost hundred meters of Peña de Francia and apparently suffers quite strong human disturbance (mainly tourism and alteration of habitat) in the more accessible parts of the mountain, especially during the summer months which coincides with the activity period of this species.

There are three more facts that do not allow us to be optimistic on the numerical evolution of this population:

(i) In his atlas of amphibians and reptiles of Salamanca, PEREZ-MELLADO (1983) already pointed to "...the necessity of a true protection besides the merely legal one that this Salamanca endemism deserves..." , referring to the Peña de Francia and the Sierra de Bejar populations. Furthermore, he states that "... the situation is more serious in Peña de Francia .... where the number of visitors is growing every year and where a dramatic numerical regression of individuals - which are scarce by themselves - has been produced in the last decade." From all this, we can conclude that the population situation can, at least, be described as regressive over the last twenty years.

(ii) Unfortunately, the tentative number of fifty specimens (ARRIBAS 1997) is

Figs. 7 - 10 (opposite page) / Abb. 7 - 10 (gegenüberliegende Seite)

Fig. 7: Peña de Francia, general view. '*Lacerta cyreni martinezricai*' is restricted to the uppermost 100 meters of the summit which is partly occupied by a sanctuary and strongly influenced by tourism especially in summer.

Abb. 7: Ansicht des Berges Peña de Francia. '*Lacerta cyreni martinezricai*' lebt nur in den obersten 100 Metern der Gipfelregion, auf der sich ein besonders im Sommer von zahlreichen Touristen besuchtes Heiligtum befindet.

Fig. 8: Habitat of '*L. cyreni martinezricai*'. Slope facing north. *Podarcis hispanica* and *Timon lepidus* were also found in this site. Here, '*L. cyreni*' can be seen on the rocks, stonewalls and even on the walls of the sanctuary.

The southern slope which is also inhabited by '*L. cyreni*' is notably more stepped.

Abb. 8: Habitat von '*L. cyreni martinezricai*'. Nordhang. *Podarcis hispanica* und *Timon lepidus* kommen hier auch vor. Hier findet sich '*L. cyreni*' auf den Felsen und Steinmauern, selbst denen des Heiligtums. Der Südhang, der ebenfalls von '*L. cyreni*' bewohnt wird, ist deutlich stufiger ausgeprägt.

Fig. 9: '*Lacerta cyreni cyreni*'. Male from Puerto de Navacerrada, Sierra de Guadarrama.

Note the absence of blue ocelli, as is also typical to '*L. cyreni castiliana*' from Gredos.

Abb. 9: '*Lacerta cyreni cyreni*'. Männchen von Puerto de Navacerrada, Sierra de Guadarrama. Beachte das Fehlen blauer Ozellen wie dies auch für '*L. cyreni castiliana*' von Gredos typisch ist.

Fig. 10: '*Lacerta cyreni cyreni*'. Female. Same locality as specimen fig. 9. Note the lack of blue ocelli.

Abb. 10: '*Lacerta cyreni cyreni*'. Weibchen. Gleicher Fundort wie Abb. 9. Auch hier fehlen blaue Ozellen.

too optimistic. As to my observations, the maximum density in a most appropriate place was 9 adult '*L. cyreni*' per 2000 m<sup>2</sup> (~ 45 per hectare). Moreover, the whole range known hardly covers a few hectares. In total, I saw about thirty individuals in all of the mountain plateau and among the adjacent boulders of the hillsides. Certainly, various factors may affect detectability in the lizards; but their number must in fact be low because in great parts of the peak region, I individually recognized all animals seen repeatedly.

(iii) Two Mediterranean lizard species were found in the summit region of Peña de Francia during prospection (not mentioned elsewhere, see PEREZ-MELLADO 1983). Several specimens of *Podarcis his-*

*panica* (STEINDACHNER, 1870) were observed in the sanctuary wall (fig. 8), and a specimen of *Timon lepidus* (DAUDIN, 1802) was seen. The presence of these lizards could indicate an advance of Mediterranean forms toward the summit of the mountain. This could correspond to progressive corraling of '*L. cyreni martinezricai*' in the peak region (due to competition and climatic causes mainly) which will lead to its natural extinction. In a similar way this might have happened so many times to mountain species.

Hence, a reliable census of the population of '*L. cyreni martinezricai*' is urgently needed to develop suited measures for the protection of this unique lizard which inhabits the summit of an isolated, charismatic, and scenic mountain.

ACKNOWLEDGMENTS

Thanks to the Estación Biológica de Doñana (Dr. CABOT, Sevilla) for the loan of specimens from the col-

lection, and to A. PASTOR (Barcelona) for revising the manuscript.

REFERENCES

AHE (Asociación Herpetológica Española) (1998): Precaución ante la avalancha de nuevas especies y subespecies de anfibios y reptiles.- *Quercus*, 147: 38-39.

ARRIBAS, O. (1996): Taxonomic revision of the Iberian 'Archaeolacertae' I: A new interpretation of the geographical variation of '*Lacerta monticola*' BOULENGER, 1905 and '*Lacerta cyreni*' MÜLLER & HELLMICH, 1937 (Squamata: Sauria: Lacertidae).- *Herpetozoa*; 9 (1/2): 31-56.

ARRIBAS, O. J. (1997): Morfología, filogenia y biogeografía de las lagartijas de alta montaña de los Pirineos. Ph. Dr. Thesis. Universidad Autónoma de Barcelona. 353 pp. (published 1997: 8 pp and microfilm. Pub. U.A.B.).

GARCÍA PARÍS, M. & MARTÍN, C. & DORDA, J. & ESTEBAN, M. (1989): Los Anfibios y Reptiles de Madrid. M.A.P.A. 243 pp.

KLEMMER, K. (1957): Untersuchungen zur Osteologie und Taxonomie der europäischen Mauereidechsen.- *Abh. senck. naturf. Ges. Frankfurt/Main* 496: 1-56.

MARTINEZ-RICA, J. P. (1979): Datos sobre la herpetología de la provincia de Salamanca. In: *Estudio integrado y multidisciplinario de la dehesa salmantina*, I. Estudio fisiográfico y descriptivo. 3ª fascículo: 213-219.

MERTENS, R. (1929): Zur Kenntnis der Eidechsenfauna Nordwest-Spaniens.- *Senckenb. Naturf. Ges.*; 39: 282-289.

MÜLLER, L. & HELLMICH, W. (1936): Mitteilungen über die Herpetofauna der Iberischen Halbinsel II: Zur Kenntnis der *Lacerta monticola*.- *Zool. Anz.* 117: 65-73.

ODIERNA, G. & APREA, G. & ARRIBAS, O. & CAPRIGLIONE, T. & CAPUTO, V. (1994): La cariólogia di due taxa rappresentati nell'erpetofauna montana: *DiscoGLOSSUS* OTTH, 1837 e le *Archaeolacerta* MEHELY, 1909 iberiche. Abstracts 1º Convegno italiano di Erpetologia Montana. Trento 6-9 aprile 1994.

ODIERNA, G. & APREA, G. & ARRIBAS, O. & CAPRIGLIONE, T. & OLMO, E. (1995): The Caryosystematics of the Iberian rock lizards. Abstracts 2nd. International Congress of Lacertids of the mediterranean region.

ODIERNA, G. & APREA, G. & ARRIBAS, O. & CAPRIGLIONE, T. & OLMO, E. (1996): The karyology of Iberian Rock Lizards.- *Herpetologica*; 52 (4): 542-550.

PEREZ-MELLADO, V. (1982): Datos sobre *Lacerta monticola* BOULENGER, 1905 (Sauria: Lacertidae) en el oeste del Sistema Central.- *Doñana Acta Vertebrata*; 9: 107-129.

PEREZ-MELLADO, V. (1983): La herpetofauna de Salamanca: Un análisis biogeográfico y ecológico.- *Salamanca, revista provincial de estudios*; 9-10: 9-78.

PEREZ-MELLADO, V. (1997): *Lacerta monticola* BOULENGER, 1905; pp. 207-215. In: RAMOS, M. A. & al. (Eds.), SALVADOR, A. (Coord.): *Reptiles. Fauna Ibérica 10*. Museo Nacional de Ciencias Naturales. CSIC. Madrid.

SNEATH, P. H. A. & SOKAL, R. R. (1973): Numerical taxonomy. San Francisco (W. H. Freeman & Co.), 573 pp.

SOKAL, R. R. & ROHLF, J. (1969): Biometry. The principles and practice of statistics in biological research. New York (W. H. Freeman & Co.), 887 pp.

DATE OF SUBMISSION: March 30th, 1999

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