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Faecal pellet size differences as a field criterion to distinguish between the two *Ctenodactylus* species (Mammalia, Rodentia)

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The Ctenodactylidae are among the oldest rodent families (Beintema et al. 1991). They are an ecological enigma as well as being a phylogenetic curiosity. The five living species are diurnal although they are to be found in desert or semi-desert conditions in Africa (George 1974). *Ctenodactylus gundi* and *C. vali* inhabit the rocky districts of the northern part of the Sahara. A preliminary study of their range in Algeria has shown that they occupy the Saharan Atlas from Tunisia to Morocco and the wadi Saoura basin to Kerzaz in the south. This range shows no discontinuity and, at first, we were unable to distinguish boundaries between the two species (Gouat and Gouat 1984). More recently, using the method described below, the two species were shown to be parapatric in Algeria (Gouat 1988).

Several criteria for species identification have been proposed in the literature (see George 1982, for review) but none of them is easy to use in the field. One of these criteria is based on the difference in size between the two species, *C. gundi* being slightly larger than *C. vali*. Though these species are diurnal, the difference in size is too small to be clearly identified by direct observation. In addition, gundis are very difficult to trap and body measurements are difficult to obtain.

A gundi site is often identified by numerous piles of droppings left by the annimals at the entrance of their rocky shelters. Fresh droppings are black cylinders 3.5 to 4.2 mm in diameter. They become white with age. In captivity a *C. vali* fed ad libitum on fresh vegetables produces 100 to 250 droppings per day in groups of 10 to 30. According to the difference in body size between the two species, a difference in the size of the droppings was to be expected.

To test this hypothesis, samples of fresh droppings were collected in different sites distributed throughout the range in Algeria (see Table). The species occupying each site was identified according to one or several of the criteria as described by George (1982).

In order to study the influence of the water content of vegetation which decreases from north to south, three *C. gundi* sites (Ferkous, Djemina and Aures 3) were located in the Aures mountains at different latitudes. For similar reasons, samples were collected at different periods of the year on a specific site for each species (Djemina for *C. gundi* and Djeniene Bou Rezg for *C. vali*).

The results are summarized in the Figure. *C. gundi* droppings are longer than the *C. vali* ones. In all the cases but one, the standard error intervals of samples of each species, do not overlap. The only exception is between the *C. gundi* Aurès 3 sample (mean length: 9.62 mm ± 0.50) and the *C. vali* Djeniene Bou Rezg 1 (B1) sample (mean length: 8.90 mm ± 0.27). The difference between these two samples is, nevertheless, significant ($t = 2.30$, $df = 88$, $p < 0.05$).

This study demonstrates that even if there are intra-specific variations in the length of droppings, according to the season or to the site, coprometry is a good criterion for field

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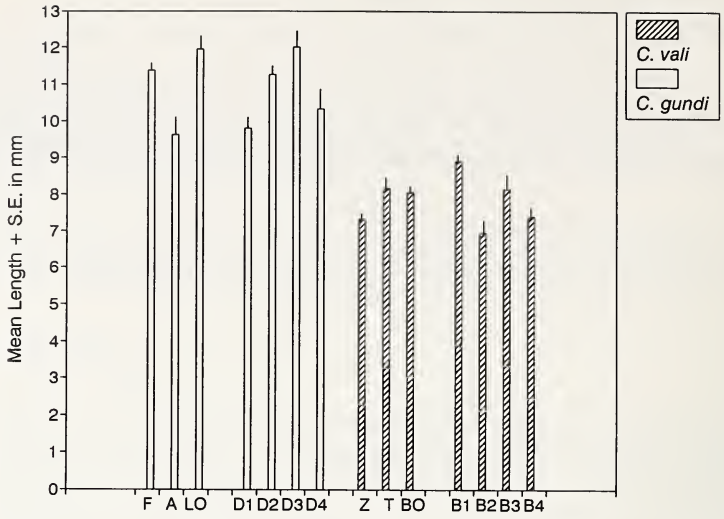

Fig. 1. Mean length (+ S. E.) of different samples of droppings of *C. gundi* and *C. vali*. Each sample is identified by a code name (see Tab. 1 for legend)

diagnosis between the two *Ctenodactylus* species. The samples must be large enough (at least 30 droppings) to be representative but they may be comprised of old white droppings. Droppings are very dry when emitted and their length does not seem to be significantly affected by age. This quality allows us to identify the species which has occupied an abandoned site, and is of great interest when the fluctuations of geographic distribution are studied. The above method might be very efficient in assessing the exact boundaries between these two species in Morocco and in Libya.

Table 1. **Geographic distribution of the collecting sites**

For each sample are given the name of the site, the date of collecting of the sample, the sample size, the geographic coordinates of the site, its altitude and an identification code

	Date of sampling	Sample size	Long. North	Lat.	Alt. in m	Code
C. gundi						
Les Oglats	12. 01. 84	100	32° 23′	0° 37′ W	950	LO
Ferkous	04. 04. 84	100	30° 10′	6° 22′ E	1700	F
Aures 3	03. 05. 85	50	34° 50′	6° 23′ E	450	A
Djemina	25. 12. 83	100	34° 54′	6° 23′ E	550	D1
	05. 05. 84	80				D2
	10. 11. 84	55				D3
	03. 05. 85	50				D4
C. vali						
Zeghamra	10. 01. 84	100	30° 10′	2° 33′ W	740	Z
Taghit 3	11. 01. 84	100	31° 05′	2° 10′ W	600	T
Beni Ounif	12. 01. 84	100	32° 01′	1° 14′ W	800	BO
Djeniene	11. 05. 84	40	32° 18′	0° 53′ W	1100	B1
Bou Rezg	23. 11. 84	40				B2
	05. 01. 85	40				B3
	10. 05. 84	40				B4

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