

Standard karyotypes of two populations of the *Scincus scincus* complex from Tunisia and Morocco (Reptilia: Scincidae)

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Abstract. A study on chromosomes of two *Scincus* populations attributed to *S. scincus* and *S. albifasciatus* was carried out by conventional Giemsa staining. Both samples showed the same diploid number of $2N = 32$ and identical chromosome morphology. Therefore, these populations seem to be lacking in chromosome changes that could act as barriers to gene flow. However, because speciation in lizards is not always associated with chromosome repatterning, the taxonomic status of “*scincus*” and “*albifasciatus*” forms remains unsettled.

Keywords. Karyotypes, *Scincus scincus*, Tunisia; Morocco.

The scincid lizard genus *Scincus* Laurenti, 1768 is a clearly-defined group of species adapted to life in areas of loose, usually wind-blown sand. This taxon is distributed from the Western Sahara Desert and its borders, eastwards to Arabia, southern Iraq and south-western Iran. North African populations fall into two groups, which may represent largely allopatric species, namely *S. scincus* (Linnaeus, 1758) in the East and *S. albifasciatus* Boulenger, 1890 in the West. However, according to Arnold and Leviton (1977), evidence for specific status is not conclusive because resting on an unsatisfactory sample base; in addition, as sympatric populations of the two presumed species have not been found so far, it is not possible to evaluate whether gene flow is still acting or not.

In the years following Arnold and Leviton's review, the taxonomic status of the Saharan *Scincus* populations remained unsettled. Faunal works and checklists by Bons and Geniez (1996), Schleich et al. (1996), and Geniez et al. (2000) variously regarded them as separated species or subspecies of *S. scincus*, but without further review of evidence. Finally, Caputo et al. (1994) compared karyotypes of *S. scincus* from Egypt and of *S. hemprichii* Wiegmann, 1837 from the Arabian Peninsula, calling for a full taxonomic re-evaluation of the group by use of non-morphologic characters like chromosomes and molecular markers. In an attempt to clarify the status of the *S. scincus* complex in North Africa, we have

studied the chromosome complements of two populations attributed to the *scincus* and *albifasciatus* forms; we have also reviewed and compared the karyological data reported in literature for these Palearctic skinks.

The karyotypes analysed come from two adult males and one adult female of *Scincus albifasciatus laterimaculatus* Werner, 1914 from south-eastern Morocco (Hamada du Dra, environs of Zagora) and from three females of *S. scincus cucullatus* Werner, 1914 from southern Tunisia (environs of Douz). Voucher specimens are deposited in the collection of V. Caputo (Faculty of Sciences, Ancona, Italy). The animals were injected with colchicine (0.05 mg/ml; 0.01 ml/g body weight) 1 hour before dissection. Metaphase plates were obtained from intestine, bone marrow and ovarian or testicular tissue. Chromosome number and standard morphology were determined by conventional Giemsa staining at pH 7.0. Chromosome nomenclature was in accordance with Levan et al. (1964). Due to the scarcity of metaphases, no banding was possible and we were able to obtain only standard karyotypes.

Diploid chromosome complements and relative Giemsa-stained metaphases are represented in Fig. 1. The specimens analysed of the two presumptive species of *Scincus* showed identical $2N = 32$ standard karyotypes, in which the first two pairs of metacentric chromosomes were considerably larger than the remaining 14. The latter decreased gradually in size, and therefore it was not possible to distinguish between macro- and micro-chromosomes. The chromosomes of the 3rd pair were also metacentric, whereas that of the remaining 13 pairs were submetacentric. No heteromorphic chromosomes were distinguishable. The karyotype of *S. scincus scincus* (Linnaeus, 1758) from Egypt (Caputo et al., 1994) is identical to those described in the present paper, whereas that of *S. hemprichii*

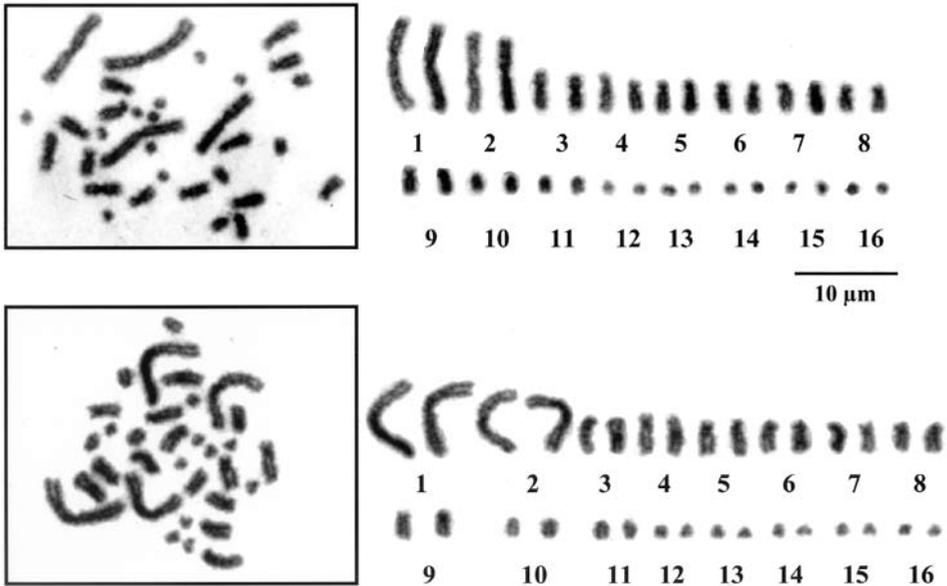


Fig. 1. Karyotypes (right) and Giemsa-stained metaphase plates (left) of *Scincus albifasciatus laterimaculatus* from Morocco (top) and *S. scincus cucullatus* from Tunisia (bottom). Scale bar = 10 μm

(Branch, 1980) differs in having two additional pairs of small acrocentric chromosomes ($2N = 36$) (Fig. 2).

The karyological data presented here and the comparison with those reported in literature evidence a uniform karyotype structure, both in diploid number and in chromosome morphology, between populations attributed to subspecific (*cucullatus* and *scincus*, within *S. scincus*) or specific (*S. scincus* versus *S. albifasciatus*) taxa (e.g., Schleich et al., 1996; Geniez et al., 2000). So, these populations seem to be lacking in chromosome changes that could act as reproductive barriers. However, because speciation in lizards is not always associated with chromosome repatterning (see King, 1981), and considering that the $2N = 32$ karyotype is plesiomorphic for skinks (Caputo et al., 1994), the lack of karyotypic differentiation does not necessarily indicate that the “*scincus*” and “*albifasciatus*” forms belong to the same biological species. Therefore, further analyses should be performed in order to clarify the taxonomic status of the *Scincus scincus* complex in North Africa. The karyotype of this latter closely resembles that of *S. hemprichii* (Branch, 1980), differing for two less small acrocentric chromosomes. Probably, the $2N = 36$ karyotype of *S. hemprichii* represents an apomorphic condition derived by fissions from the complement with $2N = 32$ chromosomes, considered the ancestral skink karyotype state (Caputo et al., 1994). This hypothesis is also in line with that of Arnold and Leviton (1977), according to which *S. scincus* is the most primitive constituent of the genus. The speciation of *S. hemprichii* and the differentiation of its karyotype would have been promoted by the Plio-Pleistocene climatic fluctuations (Suc, 1984, 1989). Indeed, during the most mesic climatic periods, the pluvial phases in the Saharan-Arabian region would have caused the isolation into a separated arid refugium of a small skink population where the genetic drift favoured the fixation of a new chromosome set. The present limited geographic range of *S. hemprichii*, marginal to the larger distribution of *S. scincus*, seems to sustain this hypothesis.

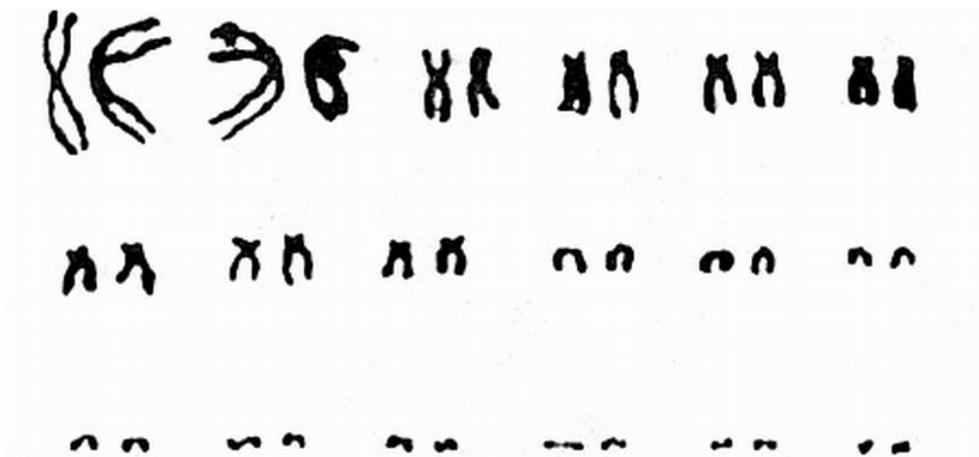


Fig. 2. Karyotype of *Scincus hemprichii* (from Branch, 1980).

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