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Karyological Differences Between *Lacerta lepida* and *Lacerta pater*

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Bischoff (1982), by means of hybridization experiments, and Busack (1987), by means of morphological and biochemical studies, have shown that the degree of genetic incompatability between the taxa which

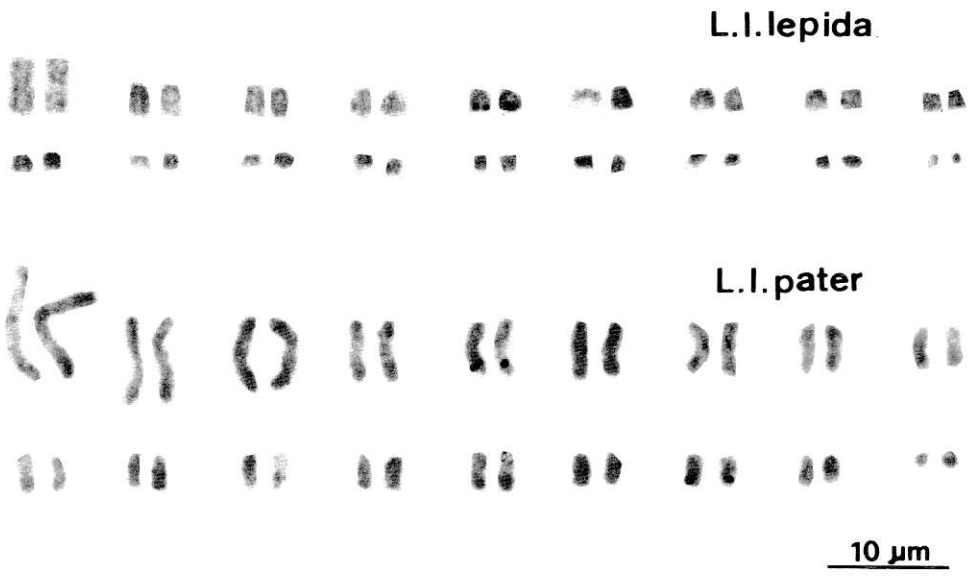

FIG. 1. Karyotypes of *Lacerta lepida* and *Lacerta pater* stained with the AgNOR method. Note the different number and localization of the NORs.

have in the past been referred to as *Lacerta lepida lepida* and *L. l. pater* by far exceeds subspecific levels, thus suggesting that these two taxa actually are two separate species, i.e., *L. lepida* Daudin, 180 and *L. pater* Lataste, 1880.

The karyotype of *L. pater* has not been studied so far, therefore within a study on the karyology of Lacertidae that we are carrying out, we considered it interesting to verify the existence of possible chromosome differences between specimens of *L. lepida* from Spain and *L. pater* from North Africa.

The study was accomplished on 5 males and 3 females of *L. lepida* from Molina de Aragon (Spain) and on 4 males of *L. pater* from Sedjenane (Tunisia) and from Bab el Arba (Taza, Morocco). Voucher specimens are deposited in the collection of V. Caputo, Naples. For each specimen the karyotype was studied by means of the standard and the AgNOR banding techniques according to methods previously described (Odierna et al., 1985; Olmo et al., 1987).

Results for *L. lepida* have already been published (Olmo et al., 1987; Odierna et al., 1987).

As shown by Fig. 1 both *L. lepida* and *L. pater* have a karyotype with 36 chromosomes of which two are biarmed macrochromosomes, 32 are uniarmed macrochromosomes and 2 are microchromosomes. This karyotype is rare in Lacertids, but it has also been found in *L. princeps*, which is considered an allied species of *L. lepida* (Rykena and Nettmann, 1986).

A remarkable difference can be seen between *L. lepida* and *L. pater* in the nucleolar organizer. In fact *L. lepida* has only one NOR occupying a telomeric position on the 5th chromosome pair, whereas *L. pater* has 2 nucleolar organizers: one localized on a subtelomeric position of the 5th chromosome pair and the other occupying a telomeric position of the 16th chromosome pair.

Various authors have emphasized that the study of NOR localization is taxonomically informative and from it, systematic and phylogenetic inferences can be made (Hsu et al., 1975; Bickham and Rogers, 1985; Amemiya and Gold, 1988). In Lacertids it has been clearly observed that the NOR position is constant in species belonging to the same genus or subgenus, but differs in species belonging to different genera or subgenera (Odierna et al., 1987).

Therefore differences observed in the NOR localization of *L. lepida* and *L. pater* show that these 2 lizards are rather different from the karyological standpoint and that this differentiation clearly exceeds the subspecific level. This is in agreement with the observations made by Bischoff (1982) and Busack (1987) and gives further support to their conclusion that *L. lepida* and *L. pater* represent two separate species.

It has often been hypothesized that for most vertebrates the existence of a single NOR chromosome pair represents a plesimorphic character, whereas the multiple NOR condition represents an apomorphic character (Hsu et al., 1975; Schmid, 1978; Gold and Amemiya, 1986). It is therefore possible that *L. lepida* has maintained a more primitive karyological condition, perhaps characteristic of a hypothetical ancestor common to *lepida, princeps* and *pater*, whereas *L. pater* seems to have undergone some further chromosomic reorganization, in particular regarding the nucleolar organizer, and thus should be considered as karyologically derived.

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