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SEZIONE III

(Botanica, zoologia, fisiologia e patologia)

Zoologia. — *The chromosome complement of some insular lacertid Lizards.* Nota di ORNELLA COBROR, presentata (*) dal Corrisp. G. CHIEFFI.

RIASSUNTO. — È stato studiato il cariotipo di 3 specie insulari di Lacertidae: *Lacerta dugesii*, *Podarcis pityusensis* e *Gallotia galloti*.

Le 3 specie studiate mostrano dei cariotipi molto simili tra loro, con 36 macrocromosomi acrocentrici e 2 microcromosomi. L'uniformità cromosomica di queste specie fornisce un'ulteriore evidenza che i riarrangiamenti cromosomici non giocherebbero un ruolo significativo durante il processo di speciazione dei Lacertidae.

Risultati preliminari sul C-banding di *L. dugesii* sembrano dare alcuni indizi sui meccanismi operanti nell'evoluzione cariologica dei Lacertidae.

The classification of at least 50 species ascribed to the genus *Lacerta* has been a much debated question. Most of the morphological features used in classifying this genus are variable throughout the group, and for this reason the genus *Lacerta* has been regrouped many times by various authors (Bedriaga, 1886; Werner, 1904; Boulenger, 1916; Klemmer, 1957; Böhme, 1971).

A recent regrouping, mainly based on non-adaptive morphological features, was proposed by Arnold (1973), who divided this genus into four new genera: *Gallotia*, *Podarcis*, *Lacerta* part I and *Lacerta* part II.

The karyotype, like other phenotypic features, can be a useful criterion for clarifying the taxonomic relationships among the species within a group. My investigation is an attempt to inquire into the possible karyologic and taxonomic relationships among three insular species of Lacertidae, whose chromosome sets have not yet been described in detail and which, according to Arnold (1973), would occupy a distinct systematic position within the group: *Lacerta dugesii*, *Podarcis pityusensis* and *Gallotia galloti*.

L. dugesii lives in Madeira and the neighbouring islands, and in some islands of the Azores. *P. pityusensis* lives in the Balearics, in particular in the group of the Pityusae (Ibiza, Formentera and neighbouring islands). *G. galloti* lives in the middle-western islands of the Canaries.

L. dugesii and *P. pityusensis* were originally grouped in the sub-genus *Podarcis* (see Arnold, 1973), but Arnold (1973) placed the former in *Lacerta* part II and the latter in *Podarcis*.

Gallotia (Boulenger, 1916) the sub-genus to which *G. galloti* was at first ascribed, is considered by Arnold (1973) to be a distinct genus.

The three species investigated in this paper are insular species that might

(*) Nella seduta del 10 marzo 1984.

have evolved independently of one another and seem to be interesting models for ascertaining whether the chromosomic uniformity, already observed in several species of Lacertidae (Kupriyanova, 1969; Gorman, 1973; Chevalier *et al.*, 1979; Palacios and Elvira, 1979; Capula *et al.*, 1982) is preserved in this case.

In order to obtain further information on the karyology of these lizards, I studied the C-banding pattern. In this paper, preliminary results obtained by this technique on the *L. dugesii* karyotype are presented.

Materials and Methods

Fifteen specimens belonging to three species of Lacertidae: five female specimens of *Podarcis pityusensis*, five female specimens of *Lacerta dugesii* and five female specimens of *Gallotia galloti* were examined. The animals were purchased from a commercial dealer, and the exact place of origin is, therefore, unknown.

The animals were injected with 0.1 ml of Colcemid^R (Calbiochem) per 10 g body weight and killed 24-48 h later. Small fragments of intestine were quickly excised, treated with hypotonic solution, fixed for 1 h in methanol-acetic acid (3-1), and squashed and stained with Mayer's acid haemalum.

The C-banding pattern was obtained with Sumner's (1972) method. The slides were treated with an aqueous saturated solution of $Ba(OH)_2$, at 55° for 5-10 min., incubated for 1 h at 60° in 2XSSC, and then Giemsa-stained (5% in phosphate buffer at pH 7) for 10 min.

Results and Discussion

All the animals examined show very similar karyotypes consisting of a diploid number of 38 chromosomes, with 36 acrocentric macrochromosomes and a pair of microchromosomes (Pl. I, fig. 1), although further study might be necessary for *G. galloti*, in which I found few plates with 39 chromosomes. The three species investigated, *L. dugesii*, *P. pityusensis* and *G. galloti*, therefore, show the chromosome uniformity characteristic of the lizard family Lacertidae.

This result does not provide support, at the karyotypic level, for the systematic position occupied by each of these species within the family since the chromosome uniformity noted is observed in species that Arnold (1973) ascribes to distinct genera.

The preservation of a remarkable chromosomic uniformity in insular species is not infrequent in the family Lacertidae. An analogous situation has been described by Gorman *et al.* (1970) in lacertid lizards living on small Adriatic islands adjacent to one another and close to the coast. In the insular species investigated in this paper, the remarkable karyotype stability is observed also in species living on islands far from one another and from the coast. Thus,

the preservation of the chromosomic uniformity in these species, whose differentiation might have taken place much earlier than that of the species from the Adriatic islands, is further strong evidence that in this family, speciation generally required little or no chromosome re-arrangements, as previously suggested by Gorman *et al.* (1970).

According to some investigators, a reduction in the microchromosome number would be the most probable event have taken place during the karyologic evolution of the lizards (Gorman *et al.*, 1967; Gorman and Atkins, 1968; Morescalchi, 1970). This is also suggested by the analysis of the C-banding pattern of *L. dugesii* (Pl. I, fig. 2), showing some macrochromosomes with C-positive centromeres, some others, with C-positive telomeric portions and completely labelled microchromosomes.

The presence of constitutive heterochromatin at the telomeric level can be due either to the amplification of pre-existing heterochromatic blocks (Nagl, 1978) or to the translocation of completely heterochromatic microchromosomes to the macrochromosomes (Stock *et al.* 1974; Tegelström and Ryttman, 1981).

The latter suggestion seems to agree with the hypothesis that the karyotype of extant Lacertidae derived from an ancestral chromosome formula with a greater number of microchromosomes (Gorman, 1970). Moreover, it could suggest that the reduction in microchromosome number depends mainly on their translocation to the macrochromosomes.

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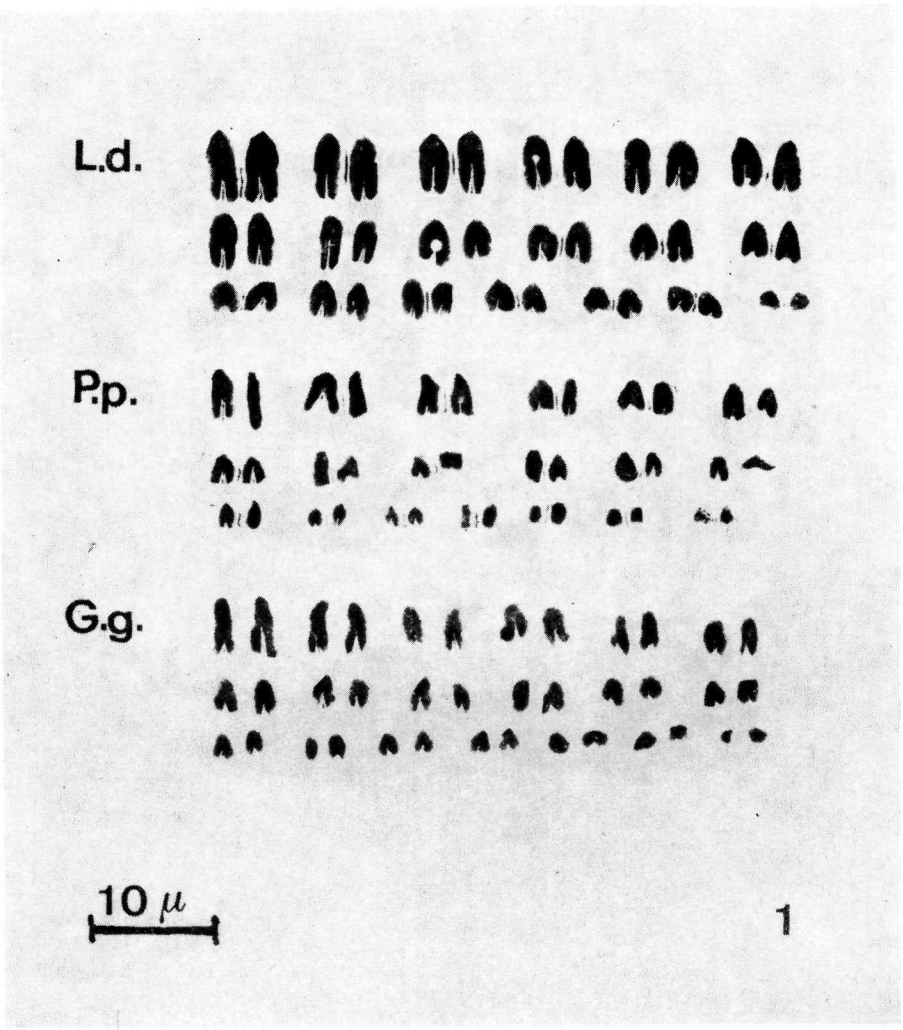

Fig. 1. – Karyotypes of the species investigated: L.d. = *Lacerta dugesii*, P.p. = *Podarcis pityusensis*, G.g. = *Gallotia galloti*.

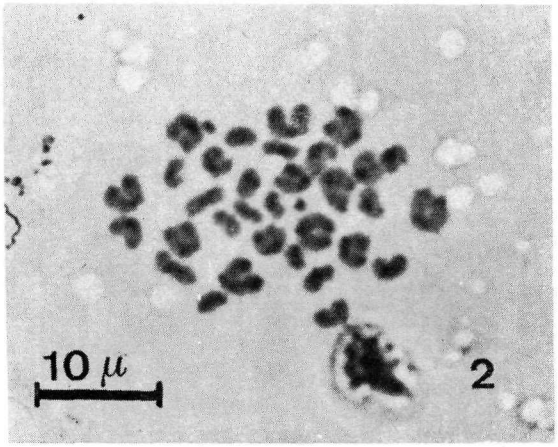

Fig. 2. – C-banded metaphase of female *Lacerta dugesii*.