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DNA Nuclear Content in the Cytotaxonomy of *Galago senegalensis* and *Galago crassicaudatus*

The DNA nuclear content in lymphocytes of peripheral blood from *Galago senegalensis* (2 males and 2 females), *Galago crassicaudatus* (3 males and 2 females) and *Perodicticus potto* (2 males) was measured by means of the Deeley integrating microdensitometer.

The mean of the DNA content does not differ significantly between *Galago senegalensis* and *Galago crassicaudatus* specimens, nor does it between the two *Galago* and *Perodicticus potto*. This finding lead us to exclude that the difference in the chromosome number between *Galago senegalensis* ($2n = 38$) and *Galago crassicaudatus* ($2n = 62$) is the result of endoreduplication.

In addition, these preliminary findings seems to lend further support to the assumption of a stronger affinity of the Galagidae with the Lorisidae rather than with the Lemuridae.

The systematic allocation of the Galagidae within the Prosimian group is still controversial (Egozue J., 1968). Chiarelli (1972), while discussing the feasibility of using the chromosome number as a taxonomic criterium, suggested that particular attention should be paid to the fundamental number (nFa) after Matthey; in Lemuridae the nFa ranges from 64 to 70, in Lorisidae from 81 to 102, whilst in Galagidae it would oscillate between 61 and 94.

Between the two best known *Galago* species, e.g. *Galago senegalensis* and *G. crassicaudatus*, the chromosome number varies from 36 to 60, whereas the fundamental number remains unchanged (nFa = 66). The problem thus arises as to the interpretation of the mechanisms involved in this difference in the chromosome number.

In the present work, the DNA nuclear content in the lymphotcytes of peripheral blood in either males of females from *G. senegalensis* and *G. crassicaudatus* was measured. Concomitantly, peripheral blood lymphocytes from two *Perodicticus potto* (Lorisidae) male specimens were studied.

The DNA nuclear content was determined by the Feulgen reaction according to Itikawa & Jordanoff (1 hr hydrolysis in 5 N-HCl at room temperature and classic Schiff's

Table 1

		2*n*	M	SM	A	nFa	DNA a.u. ± s.e.				DNA pg			
Galago senegalensis	♂	38	20	10	6	66	6·60 ± 0·31	7·66 ± 0·24			6·07	7·04		
G. senegalensis	♂	38	20	10	6	66	8·72 ± 0·26		7·54 ± 0·17		8·02		6·93	
G. senegalensis	♀	38	20	10	6	66	8·28 ± 0·22	7·42 ± 0·23			7·61	6·82		
G. senegalensis	♀	38	20	10	6	66	6·56 ± 0·34			7·34 ± 0·08	6·03			6·75
G. crassicaudatus	♂	62	0	6	54	66	9·08 ± 0·18				8·35			
G. crassicaudatus	♂	62	0	6	54	66	7·52 ± 0·16	7·42 ± 0·10			6·91	6·82		
G. crassicaudatus	♂	62	0	6	54	66	7·26 ± 0·20		7·26 ± 0·09		6·67		6·67	
G. crassicaudatus	♀	62	0	6	54	66	6·46 ± 0·17	7·04 ± 0·16			5·94	6·47		
G. crassicaudatus	♀	62	0	6	54	66	7·62 ± 0·25				7·01			
Perodicticus potto	♂	62	12	12	36	84	8·04 ± 0·40	7·72 ± 0·27			7·39	7·10		
P. potto	♂	62	12	12	36	84	7·40 ± 0·36				6·80			
Homo sapiens	0						6·52 ± 0·26				6·00			

2*n* = diploid number M = metacentric chromosome SM = submetacentric chromosome A = acrocentric chromosome nFa = fundamental number a.y. = arbitrary units s.e. = standard error pg = picograms

reagent). The reaction was performed simultaneously on all the smears from the animals under study, to which a blood smear from Man was added as control.

These conditions had proved the best ones in recent technical checkings of the quantitative reliability of the Feulgen reaction (Porchelli, 1971; Porchelli & Farinetti, in press).

Obviously, our determinations provide information on the intensity and amount of the coloured product yielded by the reaction, and only indirectly on the actual DNA amount.

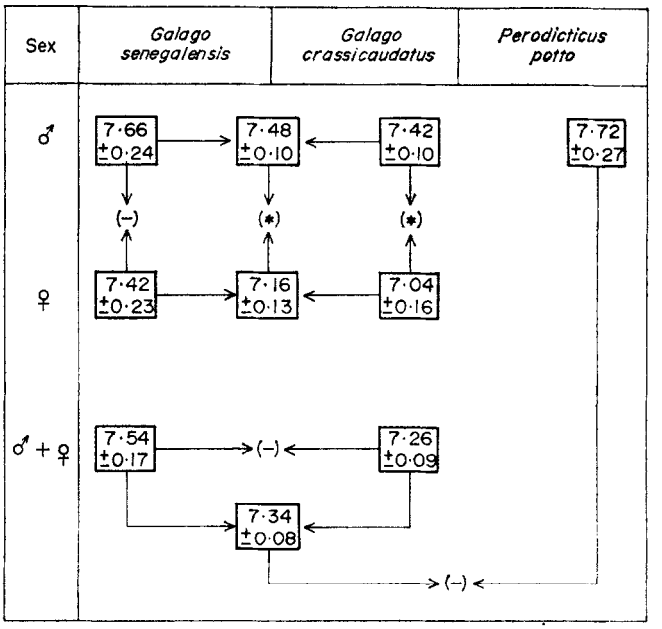
The validity of the comparisons carried out under the above conditions stems from the concept that the ratio of the Feulgen-positive material to the DNA nuclear content is constant when the reaction conditions are rigorously constant, and when investigation concerns elements which, such as the lymphocytes in the circulating blood, can be considered to be all in the same phase (G_1) of the DMA metabolic cycle.

The quantitative measurement was achieved by the Deeley integrating microdensitometer (filter 54; condenser NA 0·3; objective NA 0·95; eyepiece × 10). Two male and two female specimens from *Galago senegalensis*, three males and two females from *G. crassicaudatus* and two males from *Perodicticus potto* were used. In each individual 50 lymphocytes were measured.

Table 1 shows the results in arbitrary units; furthermore, the values are given an absolute value in pg by assigning the value of 6 pg to the DNA nuclear content of the control from Man's blood. The value of 6 pg was biochemically established by Vendrely & Vendrely (1957). Table 2 shows the results of the statistical analysis performed according to direct single comparisons between two samples by means of Student's *t*-test.

The DNA nuclear content does not differ significantly between *G. senegalensis* and *G. crassicaudatus* when the mean values from both males and females in each species are

Table 2



taken into account, whilst some difference at the limit of significance emerges from the comparison between females alone.

This result rules out the possibility that the difference between the characteristic chromosome number in the two species is due to endoreduplication. Recently, one of us (L. E. M. de B.), on the basis of his comparative study of the karyotypes from the two species, has come to the conclusion that this difference is to be regarded as a result form fission or centric fusion, which would affect 24 metacentrics in *G. senegalensis* and 48 acrocentrics in *G. crassicaudatus*.

We deem it of particular interest that such a striking rearrangement of the chromosomal material has occurred without being paralleled by any variation in the histophotometrically demonstrable DNA content.

The DNA content recorded by us in the two *Galago* species differs little, statistically, from the preliminary DNA value measured in two *Perodicticus potto* specimens.

By comparing the value of the DNA nuclear content in *Galago* and *Perodicticus* with those previously collected in Lemuridae (Manfredi-Romanini & Fontana, 1968), it seems important to underline that as concerns the DNA content the Galagidae are much nearer to the Lorisidae than to the Lemuridae

Hence, the present finding on the DNA in the Galagidae would tend to allocate them closer to the Lorisidae or farther away from the Lemuridae. This conclusion, which is in keeping with the classification more generally agreed upon, according to which the superfamily Lorisidae would include both the Lorisidae and Galagidae, needs confirmation by further determination of the DNA content in other Lorisidae individuals and in the sole other *Galago* species (*G. demidovii*) so far known, in which the karyotype has been hitherto undescribed.

Many more primate species display variations in the chromosome number within the species itself (*Cercopithecus*). Still more accurate measurements of the DNA content in individuals exhibiting different chromosome numbers might be determinant for clarification of other taxonomic problems.

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