

A NEW POPULATION OF *RATTUS RATTUS* WITH 38 CHROMOSOMES IN NORTH-WESTERN INDIA

RECENT karyological studies on *Rattus rattus* in different parts of the world have created a new interest. Contrary to the earlier concepts (Yosida *et al.*¹, Gropp *et al.*², Capanna and Civitelli³⁻⁴), it is now known that the Indian subcontinent, particularly Southern India, too has *Rattus rattus* subspecies with $2n = 38$ (Lakhotia *et al.*⁵⁻⁶, Sharma and Rajiva Raman⁷⁻⁸). Recently there was another report from the same part of the country on *Rattus rattus* in which all individuals examined showed $2n = 38$ except for one female $2n = 39$ with a supernumerary B-chromosome (Satyaprakash and Aswathanarayana⁹). Here we report a new population of *Rattus rattus* from Ahmedabad (North-western India) with 38 chromosomes.

Direct bone marrow preparations were obtained using the standard air-drying technique. Animals were injected with 0.02% colchicine (0.2 ml/kg body weight) 2 hr prior to sacrifice and the bone marrows were treated with hypotonic 0.56% potassium chloride for 20 minutes and fixed in acid methanol (1:3). Slides were prepared by keeping a few drops of suspension in fresh fixative on wet and cooled slides and were allowed to dry at room temperature. The slides were stained with Carbol Fuchsin.

A total of 9 male and 8 female adults, collected from the highly populated areas of Ahmedabad, were used in the present study. Coat colour was seen to vary in the individuals. Majority of them had a dull black dorsal skin and almost white belly, some had dull black skin but belly had some black pigmentation and in one individual both the back and belly were typically dull black as in *Rattus rattus rufescens*. The white-bellied specimens were identified as *Rattus rattus wroughtoni* Hinton and the black bellied specimen as *Rattus rattus rufescens* (Grey).

All the individuals uniformly have $2n = 38$ chromosomes and display identical karyotypes (Fig. 1). The karyotype however differs slightly from other published karyotypes of *Rattus rattus* populations with 38 chromosomes. In Table I the karyotype of the present population is compared with the karyotypes of *Rattus rattus wroughtoni* and *Rattus rattus rufescens* from South-western India having $2n = 42$ and $2n = 38$ respectively (see Lakhotia *et al.*⁵). It can be seen that the present karyotype with 38 chromosomes resembles the karyotype of *Rattus rattus rufescens* which also has 38 chromosomes, except that in the former,

there is only one small submetacentric while in the latter, there are two. In the present *Rattus rattus* the acrocentrics are 8 pairs while in *Rattus rattus rufescens* from the South there are only 7 pairs. The condition with two submetacentrics is observed in the published karyotypes of European population (Capanna and Civitelli³) and African population (Capanna and Civitelli⁴). The present karyotype with only one submetacentric may be due to a single pericentric inversion of the medium sized acrocentric pair instead of two as in other 38 karyotypes.

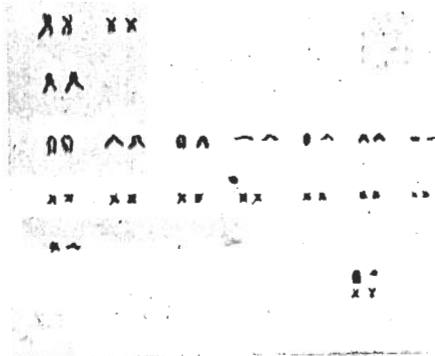


FIG. 1. Karyotype of a male *Rattus rattus* from North-western India.

TABLE I

Chromosome type	<i>R. r. wroughtoni</i> * (Sagar, Mysore State)	<i>R. r. wroughtoni</i> (Ahmedabad)	<i>R. r. rufescens</i> (Sagar, Mysore State)
	$2n = 42$	$2n = 38$	$2n = 38$
Large submetacentric	1	1	1
Acrocentric	13	8	7
Small metacentric	7	7	7
Large metacentric	0	2	2
Submetacentric	0	1	2

* From Lakhotia *et al.*⁵ (1972).

Earlier studies indicated that in India, *Rattus rattus* with $2n = 38$ was probably confined to the Southern peninsular region. Thus Lakhotia *et al.*⁵⁻⁶ reported *R. r. rufescens* from South-western India to have $2n = 38$, Sharma and Rajiva Raman⁷⁻⁸ have reported $2n = 38$ both from *R. r. rufescens* from Quilon and Nagpur and *R. r. wroughtoni*

from Quilon and Ettumanore. All these places are south of Ahmedabad from where the present *R. r. wroughtoni* (and also *R. r. rufescens*?) have been collected. We do not know whether further north also *Rattus rattus* with $2n = 38$ can be found. So far all the reports have shown only $2n = 42$ or more for *Rattus rattus* from North India. It is significant, however, that we have not yet obtained a single *Rattus rattus* from Ahmedabad with more than $2n = 38$ chromosomes. Obviously much more extensive work is required to analyze the perplexing problem of karyotype variability and evolution in *Rattus rattus*.

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