TABLE 1

Δ^{5}–3 β–Hydroxysteroid dehydrogenase activity in the testis of Rana tigrina and the interrenal tissue of Bufo melanostictus

Substrates*	Intensity of reaction†		
	Interstitial Leydig cells	Seminiferous epithelium	Interrenal cells
1. 3β-Hydroxypregn-5-en-20-one (Pregnenolone)	++	−	+++
2. 3β-17α-Dihydroxypregn-5-en-20-one (17 α-hydroxypregnenolone)	+	−	++
3. 3β-Hydroxypregn-5, 16–en–20–one acetate (16–Dehydro-pregnenolone acetate)	+	−	++
4. 3β-Hydroxyandrost-5-en-17-one (Dehydroepiandrosterone, DHA)	+++	±	++++
5. 3β-Hydroxy-5β-androstan-17-one (Etiocholanolone)	+++++	±	+++++
6. Control	−	−	−

* All the chemicals are of Sigma Grade, obtained from Sigma Chemicals Company, U.S.A.
† Intensity of the reaction is graded (−) to (+++++); (−) denotes the absence of reaction and (+++++), a maximal reaction.

all the substrates used but with varying intensity (Table I). The renal tubules were devoid of any Δ^{5}–3 β–HSDH activity. 11 β–HSDH and 17 β–HSDH activities were found both in the interrenal tissue and the renal tubules, but the reactions were weak in the former and relatively more intense in the latter. The activities of G–6–PDH, DPNH and TPNH diaphorases were intense in the Leydig cells, interrenal cells and the kidney tubules. The adrenal medullary cells, which were identified by the positive chromaffin reaction, did not show any of these enzyme activities.

The presence of Δ^{5}–3 β–HSDH enzyme in the Leydig cells and the interrenal tissue suggests that they are capable of oxidising Δ^{5}–3 β–hydroxysteroids to Δ^{4}–3 ketosteroids, a step that occurs in the early biosynthesis of all the hormonally active steroids[5]. It is interesting to note that DHA is used preferentially in the Leydig cells as well as the interrenal tissue. This suggests that *DHA-androstenedione* conversion takes place prominently in these cells and is similar to that of Leydig cells of *Rana esculenta*[6], *Rana cyanophlyctis*[7] and that of the mouse[1]. A more intense formazan deposition obtained with etiocholanolone might be due to the possible removal of hydrogen from the 5 β–position also[1]. The presence of 11 β–HSDH activity in the interrenal tissue suggests its potentiality to convert 11 β–hydroxyandrostenedione to 11–keto androstenedione. Similarly, the presence of 17 β–HSDH activity in the toad interrenal and the kidney tubules suggests that both are probably capable of *estradiol-estrone* and *testosterone-androstenedione* interconversions.

The intense reaction of G–6–PDH in all the tissues studied also supports the probable steroidogenic role of these cells, for this enzyme has an active role in providing the energy needed for hydroxylations during steroidogenesis[8]. In conclusion, the presence of these enzymes provides good evidence, albeit indirect, that the interrenal tissue of the toad and the Leydig cells of the frog are capable of steroid biosynthesis.

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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 Civitelli[3,4]), 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 Raman[7,8]). Recently there was another report from the same part of the conutry on *Rattus rattus* in which all individuals examined showed $2n = 38$ except for one female $2n = 39$ with a supernumerary B-chromosome (Satyaprakash and Aswathanarayana[9]). 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*

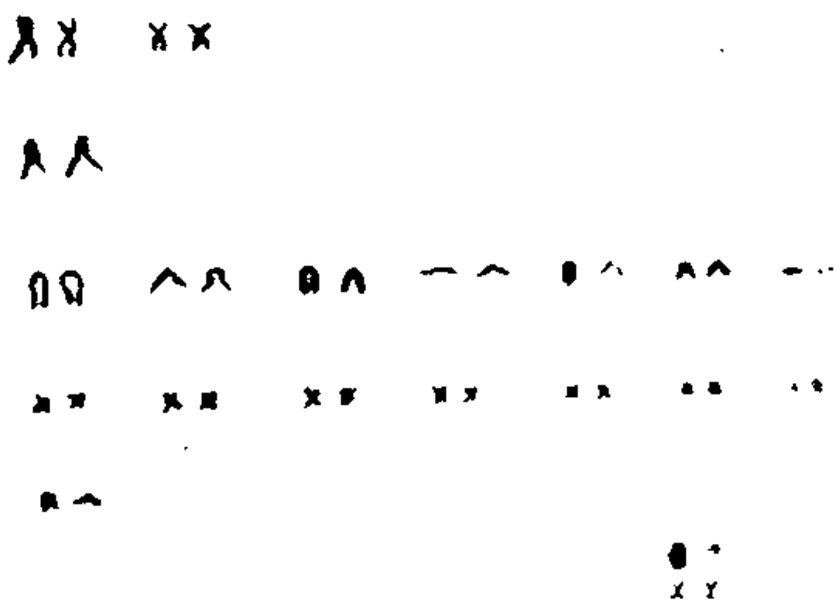

FIG. 1. Karyotype of a male *Rattus rattus* from North-western India.

populations with 38 chromosomes. In Table I the karyotype of the present population is compared

TABLE I

Chromosome type	*R. r. wroughtoni** (Sagar, Mysore State)	*R. r. wroughtoni* (Ahmedabad)	*R. r. rufescens** (Sagar, Mysore State)
	$2n = 42$	$2n = 38$	$2n = 38$
Large subtelocentric	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).

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 Civitelli[3]) and African population (Capanna and Civitelli[4]). 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.

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 Raman[7,8] 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 perplex-

ing problem of karyotype variability and evolution in *Rattus rattus*.

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ON THE DISTRIBUTION OF *POLYGALA JACOBII* CHANDR.

MUKHERJEE (1958) presented a synopsis of Indian and Burmese *Polygala* Linn. which included 30 species. Recently, Chandrabose (1967) described a new species *P. jacobii* Chandr. from Coimbatore, Madras State, mentioning therein "Allied to *P. chinensis* Linn. but differs in having shorter racemes; capsule broader than long; seeds ovoid; appendages of the caruncle winged, suborbicular, membranous, extending downwards to about 2/3 the length of seed".

An examination of the specimens of the genus *Polygala* Linn. present in the herbarium of the Botanical Survey of India, Poona, revealed that two specimens, though identified as *P. chinensis* Linn., come closer to *P. jacobii* Chandr. in all the characters cited above excepting the shape and size of the appendages of the caruncle; the two appendages are similar to the description given above but the third one is linear, acute and all are extending downwards to only about 1/2 the length of seed (Fig. 1). Since the variations are considered to be very minor to be taken note of seriously, these two specimens have, therefore, been identified as *P. jacobii* Chandr. Out of these two specimens one is from Pandayanpara Hill: Ariankaru in Kerala State and the other from Junnar: Poona District in the Maharashtra State, thus extending its distribution from one end of the Western Ghats to the other, a very interesting feature. It is quite likely that this species may be collected from many more localities in future along the Western Ghats. The study of its populations may also yield noteworthy data to determine and interpret the variations in this species as noted above.

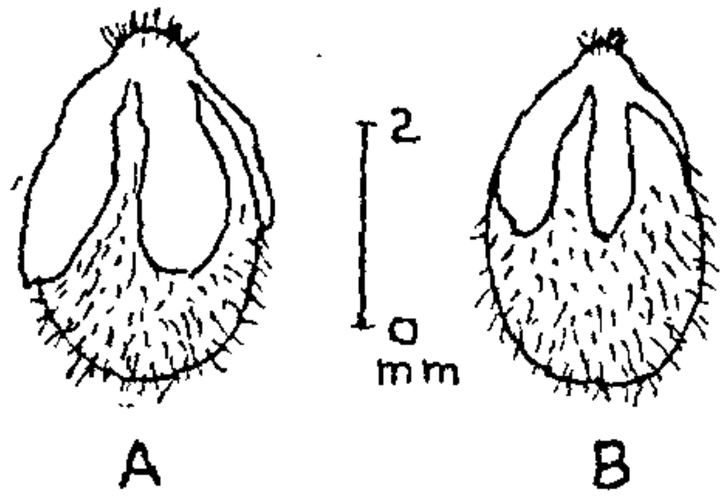

FIG. 1. *Polygala jacobii* Chandr. A seed showing (A) normal appendages; (B) variations in the appendages of the caruncle.

Specimens Examined

Pandayanpara Hill: Ariankaru (Kerala), *Subramanian* 77334 (2-12-1961); Inglun—13 miles west of Junnar, Poona District (Maharashtra State), *Hemadri* 104472 (12-1-1965).

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MORPHOLOGICAL DIVERSITY IN *PHASEOLUS SUBLOBATUS* ROXB.

Phaseolus sublobatus Roxb., the wild relative of urid (*Phaseolus mungo* L.) and mung (*Phaseolus aureus* Roxb.) occurs chiefly in the submountainous tracts of peninsular India, extending northwards. During plant exploration to the subhilly-hilly parts of Punjab, U.P. and Western Ghats in Maharashtra, germplasm collection of this species was made from the open, biotically disturbed habitats. The populations depicted morphological variations in plant characters and the various accessions/collections