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# A NEW FOSSIL RODENT *RHIZOMYOIDES SAKETIENSIS* SP. NOV. FROM THE TATROT MEMBER (ASTIAN) OF SIWALIK FOSSIL PARK, SAKETI, SIRMUR DISTT, HIMACHAL PRADESH

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ABSTRACT

The paper describes a new fossil rodent *Rhizomyoides saketiensis* sp. nov. from the Tatrot Member (Astian) of the Upper Siwalik Formation exposed in the Siwalik Fossil Park, Saketi (Markanda Valley), Sirmur district, Himachal Pradesh. Associated fauna recovered from the same stratigraphic level is also listed.

## INTRODUCTION

Fossil material of rodents is found very rarely in the Siwalik Formations as compared to other mammalian fossils. Till date known forms reported from this region represent nine genera containing seventeen species ranging in age from Chinji (Upper Miocene) to Pinjor (Lower Pleistocene). Such a low frequency in these formations is attributed to their small size and lack of intensive search. With these facts in view the authors, while engaged in the Phase II work of the Siwalik Fossil Park—Saketi (Lat. 30°30′22″ : Long. 74°14′35″), attempted sieving of residual material resulting from the weathering of Siwalik clays and sandstones exposed in the park area at Saketi. Most of the fine bone material recovered, being of fragmentary nature only two well preserved ramii fragments could be extracted which form the subject matter of the present paper.

In recent years, the earlier collections of fossil rodents from the Siwaliks, have been studied elaborately by C. C. Black (1972). He has also tried to clarify much of the confusion regarding the basis for their classification. The criteria laid down by him has been followed in this paper in the identification of the material.

For comparison with the Indian fossil rodents the authors have depended upon the descriptions given by Black, because all the specimens of the Geological Survey of India at Calcutta were not readily available. The two ramaii under description were collected cvasi *in situ* in the Tatrot Member (Astian) which comprises nearly 300 metres thick succession of clays and sandstone Fig. 2) at the Siwalik Fossil Park premises (Fig. 1). From the same area a rich vertebrate fossil collection was recovered by Verma and Verma during the year 1969-72 which is now displayed in the Field Museum of Siwalik Fossil Park at Saketi. The faunal assemblage is correlatable with the fauna of the Quranwala zone, (Sahni and Khan 1959).

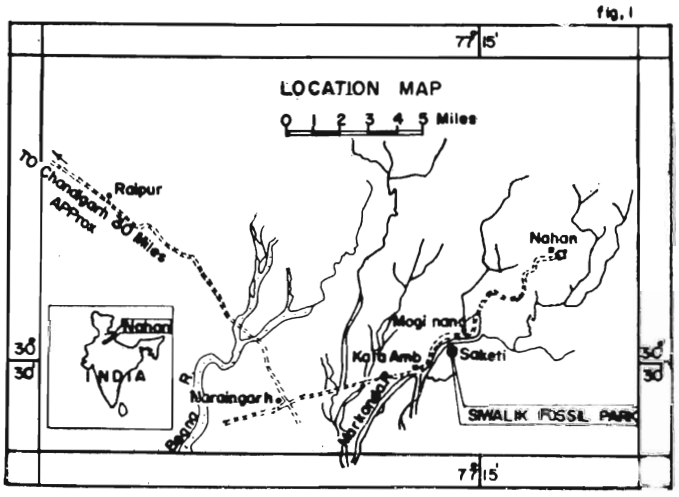



Fig. 1. Showing geographical position of Siang District in Arunachal Pradesh (Assam Himalaya)

## SYSTEMATIC DESCRIPTION

*Suborder* Myomorpha Brandt 1855

*Family* Rhizomyidae Miller and Gidley 1918

*Genus* *Rhizomyoides* Bohlin 1946

*Type Species* *Rhizomyoides sivalensis* (Lydekker)

*Rhizomyoides saketiensis* sp. nov.
(Plate I—A-D)

*Derivation of name :* After the village Saketi near which the *holotype* and *paratype* were found and the Siwalik Fossil Park is located.

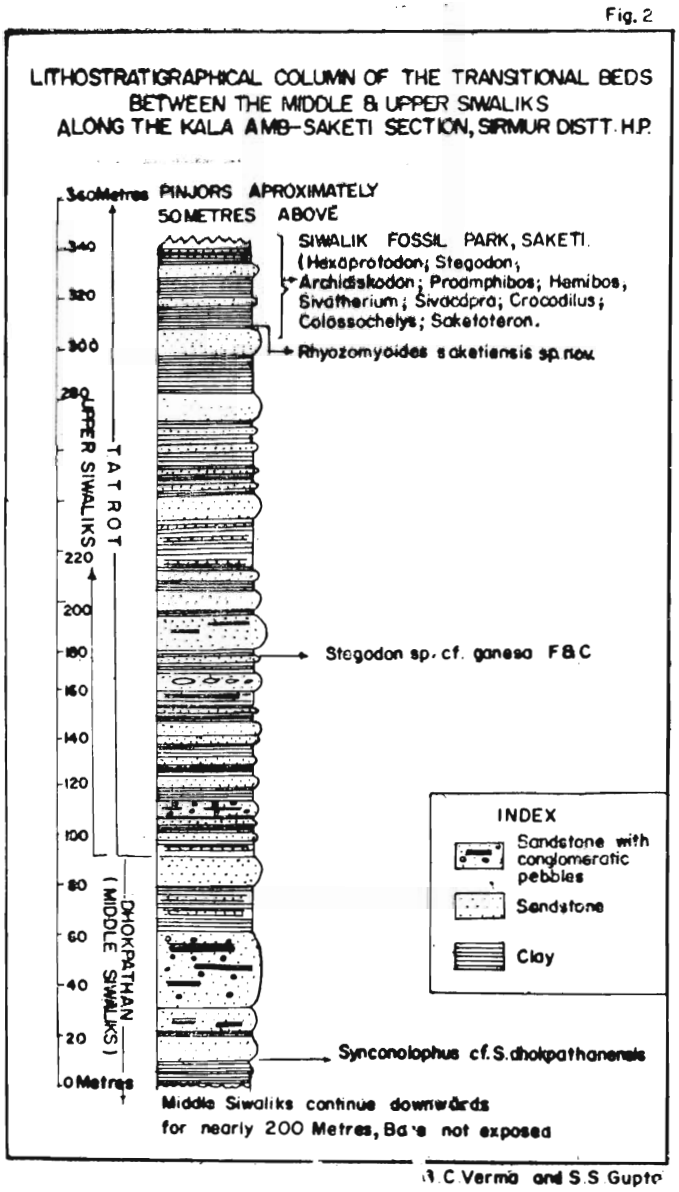



Fig. 2. Sketch geological map of a part of Siang district.

*Holotype :* GSI Type No. 19549. Partial right mandibular ramus with $M_2$ and $M_3$.

*Paratype :* GSI Type No. 19550. Partial left mandibular ramus with $M_2$.

*Repository :* Geological Survey of India, Calcutta.

*Diagnosis :* A large sized form ; mandible heavy and deep with strong and bulbous masseteric ridge ; molars hypsodont ; lingual re-entrants on $M_2$ and $M_3$ converging lingually and fanning towards the buccal sides. $M_2$ with one buccal and three lingual re-entrants ; $M_3$ with one buccal and two lingual re-entrants. Incisor long extending much beyond $M_3$ on the coronoid process ; equilaterally triangular in cross section with buccal angles rounded.

*State of preservation :* The *Holotype* (GSI Type No. 19549) represents a right mandibular ramus with $M_2$ and $M_3$ intact. $M_1$ seems to have been shed before fossilization and only its root sockets are preserved. Enamel wall of $M_2$ slightly chipped from the antero-lingual end. The ramus is broken from its anterior and after $M_1$ as well as from the ascending portion at the posterior side. The bone covering the incisor at the base is also partly chipped possibly during the stream transport, as a result the tooth has been exposed, over a considerable distance along the ventral side of the ramus. Alveolar outline and the masseteric region are well preserved.

*Description : Holotype.* Ramus thick, deep and gently sloping anteriorly ; ascending portion starts rising gradually behind the $M_3$, teeth hypsodont, inclined anteriorly. $M_2$ carrying one buccal and three lingual re-entrants ; anterior and posterior ones elongated; central re-entrant short. An elongated central lake isolating from the anterior re-entrant which might be continuous with it in the early stages of wear ; similarly the central lingual re-entrant might be joined with the buccal re-entrant making a transverse valley across the tooth. $M_2$ with one buccal and two lingual re-entrants, anterior lingual re-entrant with a posterior arm possibly connected with the buccal re-entrant making a transverse valley in the unworn tooth ; anterior lingual re-entrant deep, whereas posterior one shallow as seen on the lingual wall. Buccal re-entrant of both $M_2$ and $M_3$ are deep and elongated. Re-entrant pattern of both the molars fan-shaped as viewed on the occlusal surface. On each molar the anterior and central lingual re-entrants must have made forked valleys on the unworn tooth with the posterior arm being in continuation with the buccal valley.

Incisor long and slender continuing beyond $M_3$ on the coronoid process ; equilaterally triangular with buccal angle more rounded than the other two ; two continuous grooves on the ventral surface and a single prominent one on the lingual surface towards the base.

Masseteric ridge sharp crested and extending up to the anterior part of $M_2$.

The *paratype* (GSI Type No. 19550) is a left mandibular ramus broken from the anterior and posterior ends. $M_2$ is well preserved but chipped from the lingual as well as antero-buccal walls. However, disposition of re-entrants is clear. The crown of $M_2$ and $M_3$ are badly broken and only their bases are seen. Incisor running at the base of the ramus is visible in cross sections, at the anterior as well as on the posterior side behind the $M_3$. Masseteric ridge beneath $M_2$ is distinct but its actual disposition at the anterior end is not preserved. The specimen has suffered considerable wear due to long exposure.

*Discussions :* Considering the mandibular characters and number of re-entrants on $M_2$, as postulated by Black (1972) both the present ramii specimens are referable to the Genus *Rhizomyoides* Bohlin 1846. The material could not be compared with any specimen of the living forms of the Genus *Rhizomys* Grey 1831. However, from the teeth characters mentioned in the same paper it seems evident that the present material has more in common with *Rhizomyoides* rather than *Rhizomys*.

Among the five species of the Genus *Rhizomyoides* described by Black the present specimen differs from *R. punjabicus* (Colbert) and *R. nagrii* (Hinton) in dimensions of teeth and characters of the mandible. The later two being considerably smaller forms. Our specimen is nearly as large as that of *R. pilgrimii* (Hinton) but the shape of the jaw is considerably different as it has a gradually rising coronoid portion commencing fairly posterior to the $M_3$ as against the steeply rising one (between $M_2$ and $M_3$) in *R. pilgrimii*. The mandible is also deeper in the later. From *R. pinjoricus* (Hinton) it is distinct in possessing a strong bulbous masseteric ridge, large $M_2$ which is as long as wide with equally prominent anterior and posterior lingual re-entrants, and a slightly larger $M_3$ with two lingual re-entrants, whereas, *R. pinjoricus* lacks a distinct masseteric crest, $M_2$ being wider than long having shorter central and posterior re-entrants and $M_3$ with one lingual re-entrant. Nevertheless a close relationship seems to exist between the two forms and it is quite likely that these forms emerged from a common stock not much down in the stratigraphic column.

A certain relationship also exists between *R. sivalensis* (Lydekker) and the present specimen in having heavy masseteric crests and nearly similar $M_2$ and $M_3$ structures as far as the placement of anterior and posterior lingual re-entrants and their relation to the respective buccal re-entrants is concerned. The incisor of the present specimen as well as that of *R. sivalensis* (Black, text fig. 5, page 251) also appear to be similar in their disposition. However, the latter is considerably smaller, in the dimensions of teeth and mandible (Table I).

Prasad (1970) described a new form from Haritalyanger area (Nagri stage), *Rhizomys harii* Prasad 1970 (GSI No. 18085). This specimen too was not available in the GSI collection for comparison, neither its figure (Prasad—plate XXI) is clear enough for inferring the diagnostic characters. However, from the text description the form appears to belong to *Rhizomyoides* Bohlin. Compared with the material under discussion *R. harii* is again a medium sized form and stands no relationship in dimension as well as mandibular characters.

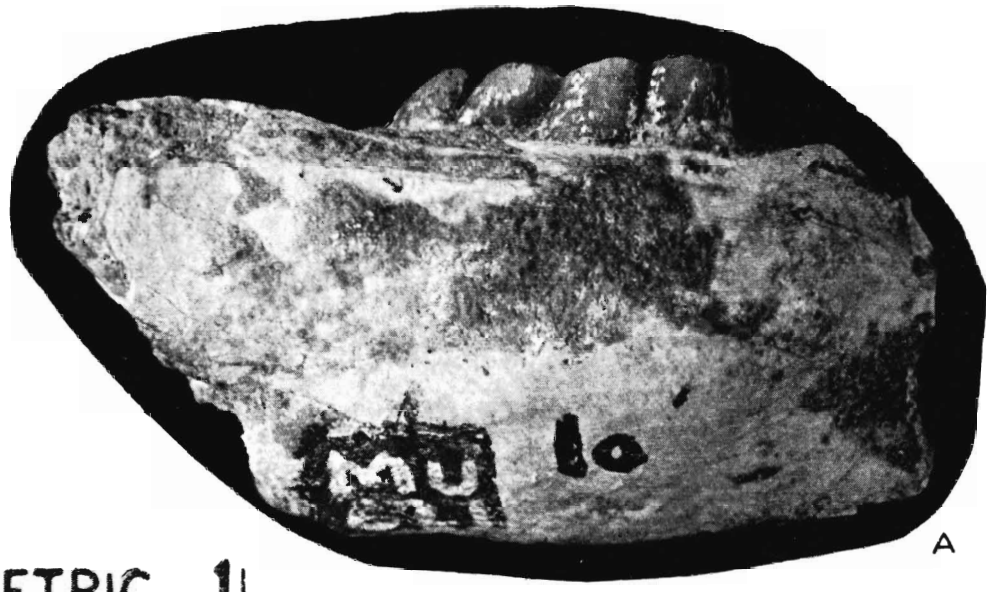
From the foregoing discussions it is evident that the present form differs considerably from the known species of the Genus *Rhizomyoides* and a new form namely *Rhizomyoides saketiensis* sp. nov. is therefore established.

Keeping in view the interrelationship of the characters of mandibles, $M_2$ and $M_3$ among *R. sivalensis*, *R. pinjoricus* and the present form it seems probable that the latter

Table I—Comparative measurements in mm

| | | *Rhizomyoides pinjoricus* GSI D—280 | | *R. pinjoricus* GSI D-279 | | *R. saketiensis* sp. nov. GSI Type No. 19550 | | *R. saketiensis* sp. nov. GSI Type No. 19549 | | *R. sisalensis* GSI D—277 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ratio | $\frac{L}{W}$ | Ratio | $\frac{L}{W}$ | Ratio | $\frac{L}{W}$ | Ratio | $\frac{L}{W}$ | Ratio | $\frac{L}{W}$ |
| $M_2$ | a — p | 3.75 | 0.78 | 3.75 | 0.79 | 5.00 | 1.00 | 5.20 | 0.87 | 4.20 | 1.08 |
| | tr | 4.80 | | 4.75 | | 5.00 | | 6.00 | | 3.90 | |
| | tr | 4.80 | | 4.75 | | 5.00 | | 6.00 | | 4.20 | |
| $M_3$ | a — p | 4.20 | 0.95 | 4.15 | 1.00 | — | — | 5.00 | 1.00 | 5.00 | 1.28 |
| | tr | 4.40 | | 4.15 | | — | | 5.00 | | 3.90 | |
| | tr | 4.10 | | 4.15 | | — | | 4.00 | | 3.70 | |
| $I_1$ | a — p | 4.60 | 1.02 | — | — | 4.50 | 1.10 | 4.50 | 1.10 | 3.45 | 1.23 |
| | | 4.50 | | — | | 4.10 | | 4.10 | | 2.80 | |
| depth mand. below $M_2$ | | 14.4 | | — | | 14.50 | | 14.50 | | — | |
| Width mand. below $M_2$ | | — | | 10.1 | | 9.00 | | 10.00 | | — | |
| Alveolar length, $M_1$-$M_3$ | | — | | 14.80 | | 21.00 | | 19.00 | | 14.60 | |

(Dimensions of *R. pinjoricus* and *R. silvalensis* after Black).



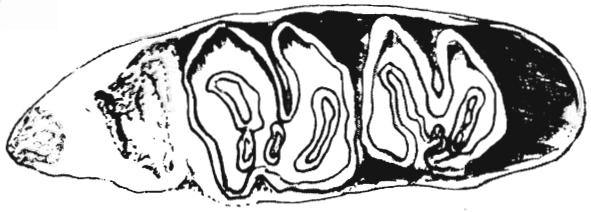

A

METRIC 1

B

METRIC 1

C

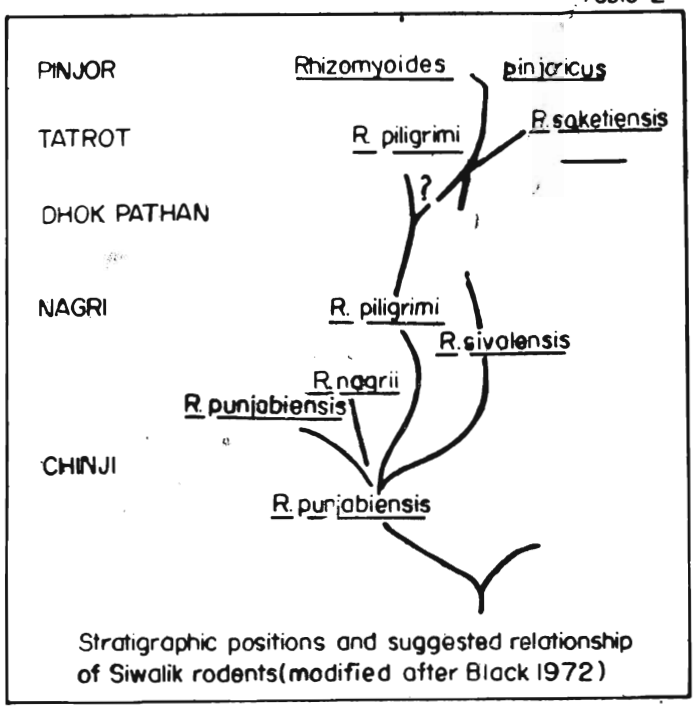


D

METRIC 1

descended from *R. sivalensis* stock and was possibly a close relative and contemporary of *R. pinjoricus* during the Plio-Pleistocene period (Table 2).

Table-2




Stratigraphic positions and suggested relationship of Siwalik rodents(modified after Black 1972)

It will be appropriate to add here a line regarding the stratigraphic implication of the present specimen in relation to *R. pinjoricus*. The later has been assigned a stratigraphic position, from the lower horizons of the Pinjor stage, but its exact locality has not been given. Since in the type locality for the Pinjor Member, detailed work by Sahni and Khan (1959) Verma and Verma (1965—72), and Nanda (1973) the stratigraphy has been revised and the basal horizons of Pinjor area now recognised as the Tatrot Member (Astian-hitherto earlier unknown), it is quite possible that *R. pinjoricus* was also collected from the upper horizons of the Tatrot Member. Even if it is from lower Pinjor the time gap between the two forms is not much.

*Associated fauna :* The Tatrot Member of Siwalik fossil Park, Saketi comprises nearly 300 metres thick succession of sandstone and clay bands (Fig. 2), the top horizons of which have yielded a vertebrate faunal assemblage including forms like *Archidiskodon planifrons* Falconer & Cautley ; *Anuncus sivalensis* (Cautley) ; *Hippopotamus* (*Hexaprotodon*) *sivalensis* Falconer and Cautley; *Hipparion* cf. *antilopinum* Falconer and Cautley; *Saketoteron tetroinse* Srivastava and Verma ; *Sivacapra* cf. *S. sivalensis* (Lydekker) ; *Proamphibos* cf. *lachrymans* Pilgrim etc. The *Rhizomyoides saketiensis* sp. nov. was collected from one of the horizons yielding the above fauna which has Astian elements (Gupta, *et al.*, 1977),

During the Tatrot period the Siwalik fauna witnessed the zenith of its evolution and some of the rodents viz. *R. pilgrimii*, *R. saketiensis* and *R. pinjoricus* attained large sizes during their evolutionary process.

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EXPLANATION OF PLATE

PLATE I

GSI Type No. 19549

A : *Rhizomyoides saketiensis* sp. nov. Buccal view.

B : *Rhizomyoides saketiensis* sp. nov. Lingual View.

C and D : *Rhizomyoides saketiensis* sp. nov. Occlusal view.