

# *Occitanomys (Rhodomys) vandami* nov. sp. (Muridae, Mammalia) from the Early Pliocene/Early Ruscinian Fauna of İğdeli (Turkey)

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**Abstract:** The collection of small mammals from lacustrine sediments at İğdeli hill (SW of Sivas city, Central Anatolia) contains seventeen species of rodents and two species of lagomorphs. There are four Muridae: *Apodemus dominans*, *Occitanomys (Rhodomys) vandami* nov. sp., *Micromys bendai*, and *Muridae* gen. et sp. indet., six Cricetidae: *Cricetus* cf. *lophidens*, *Mesocricetus* cf. *primitivus*, *Cricetulus migratorius*, *Allocricetus bursae*, *Kowalskia* sp. and *Cricetidae* indet., two Arvicolidae: *Promimomys insuliferus* and *Promimomys enginae*, one Gerbillidae: *Pseudomeriones hansii*, one Spalacidae: *Spalacidae* gen. et sp. indet., one Gliridae: *Myomimus igdeliensis*, one Sciuridae: *Tamias* sp., one Eomyidae: *Keramidomys* cf. *carpathicus* and two Ochotonidae: *Ochotona mediterraneensis*, and *Prolagus* sp.

The rodents in the fauna include a new species of murid, which is characterized by its small size (in the length/width ratio) and simple molar morphology. In this paper, I present the description of *Occitanomys (Rhodomys) vandami* nov. sp. The İğdeli locality is assigned to the Early Pliocene / Early Ruscinian (MN 14) on the basis of the occurrence of *Promimomys insuliferus* in the İğdeli fauna.

**Keywords:** İğdeli, Early Pliocene / Ruscinian, Muridae, *Occitanomys (Rhodomys)*.

## INTRODUCTION

The present study is about *Occitanomys (Rhodomys) vandami* nov. sp. from the Early Pliocene fauna of İğdeli. İğdeli is situated southwest of Sivas city (Central Anatolia, Turkey), (Fig. 1). Small mammals from the Early Pliocene of İğdeli were collected during current geological projects of the M.T.A. (Mineral Research and Exploration General Directorate of Turkey).

The assemblage of micromammals is quite varied, and consists of seventeen species of rodents and two species of lagomorphs. The relative age of the locality İğdeli is inferred on the basis of the stage of evolution of the rodent dentitions and the occurrence of *Promimomys insuliferus* in İğdeli locality suggests an Early Pliocene (MN 14) age. Four among the seventeen rodent species are Murinae and the fauna include a new species of murid, thus, the İğdeli local fauna is the Early Pliocene assemblage with abundant Murinae to become known from the Central Anatolia.

In this paper, I present a systematic study for a new species (*Occitanomys (Rhodomys) vandami*) of murid. The morphological description of the new species is given within its own systematic relationship.

## MATERIAL AND METHODS

Small mammals from the Early Pliocene of Anatolia were collected in the context of the MTA. This material was collected from the fine-grained sediments under the lacustrine limestones in the upper part of the Eğerci Formation (Gemerek, Sivas) [1].

The murid teeth described below have been collected by wet-screening material of sediment fossiliferous bed from İğdeli locality. The mesh of the finest sieve used is 0.5 mm. The approximate weight of the matrix washed from the locality was 3000 kg. The residues obtained after washing have been sorted by using a microscope. The maximum lengths of the murid cheek teeth have been measured from front to back whereas the maximum widths have been taken in the labial to lingual sense. The teeth were measured with a Nikon measuroscope. Measurements (length X width) are given in millimeters in the table. The figures of teeth are all magnified by 20. The teeth terminology used here follows [2]. The İğdeli material is stored in the collections of the General Directorate of Mineral Research and Exploration (M.T. A.), in Ankara (Turkey).

## Systematic Description

Order Rodentia Bowdich, 1821

Family Muridae Gray, 1821

Genus *Occitanomys* Michaux, 1969

Type Species *Occitanomys brailloni* Michaux, 1969

Species *Occitanomys (Rhodomys) vandami* n. sp. (**Plate I**)

Type Locality: İğdeli, Central Anatolia, Turkey

Type Level: Early Pliocene (Early Ruscinian)

Holotype: Dext M1 (**Plate I**, Fig. (5), İĞ.351)

Derivatio Nominis: It is named after Dr. Jan van Dam (Nederland) in recognition of his contribution to the ecology part of my PhD thesis.

Diagnosis: The M1-2 always have a t1 bis and the t1 is separated from the t2 or is connected with the t1 bis in the

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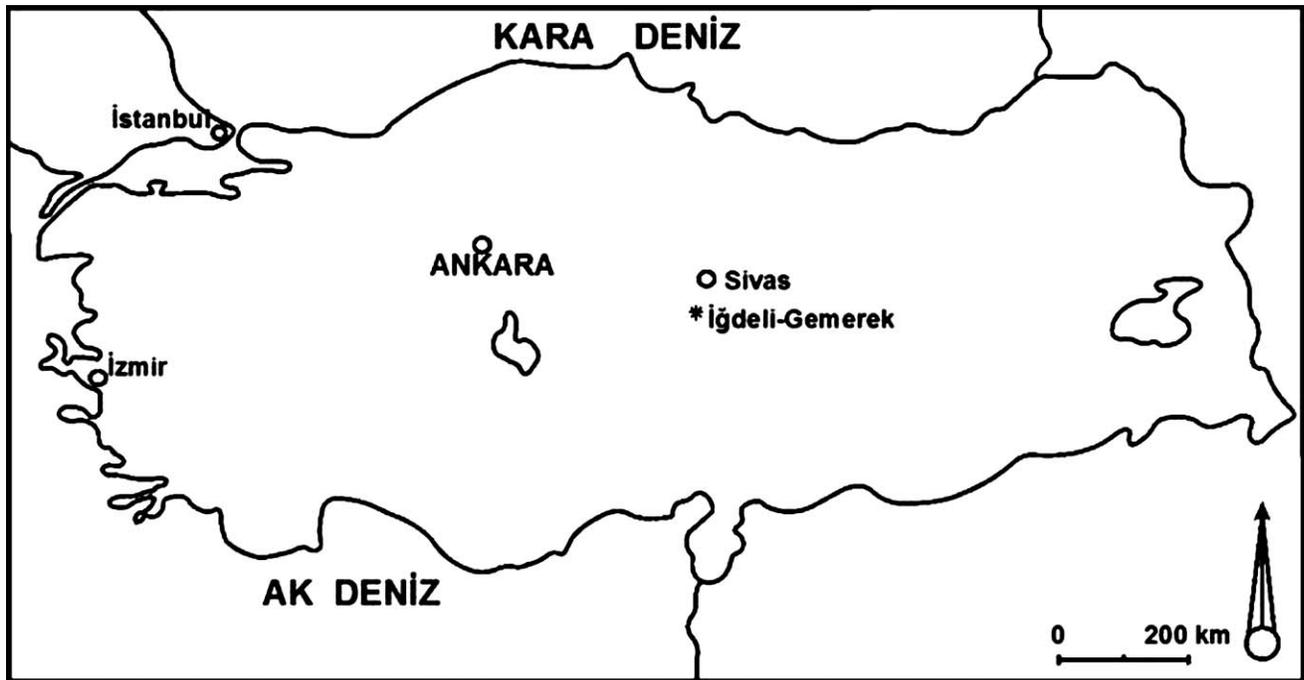


Fig. (1). Sketch map showing the approximate position of the Early Pliocene locality of \* İğdeli (Gemerek, Sivas).

M1, the t4-t8 and the t6-t9 are connected and the t12 is either absent (22%) or developed in the form of a crest (13%) or well developed (55%) on the M1. The M2 usually has four roots. The longitudinal crest is either absent or weak or developed on the M2.

Differential Diagnosis: *Occitanomys hispanicus* differs from *Occitanomys (Rhodomys) vandami* due to the absence of a t1 bis in its M1 - M2 and the separation between the t6-t9 in all M1 - M2. *Occitanomys (Rhodomys) sondaari* and *Occitanomys (Rhodomys) adroveri* differ from the İğdeli species due to the absence of a t1 bis in the M1 - M2 and the separation between the t4 and t8. The t6 and t9 are never connected in M1 – M2 of *O. (Rhodomys) sondaari*, whereas *O. (Rhodomys) adroveri* additionally differs from *O. (Rhodomys) vandami* by its great size and the presence of only three roots on M2. *O. (Rhodomys) debruijini* differs from *Occitanomys (Rhodomys) vandami* due to the isolation between the t1 and the t2 in M1, the absence of a t12 in the M1 - M2, the presence of only three roots in the M2, the more often absence of a longitudinal crest from the m1, and the absence of a c1, and the posterior tubercle in the m2.

**MATERIAL AND MEASUREMENTS**

	Length			Width	
	Range	Mean	N	Range	Mean
m1	15.50-17.50	16.43	45	8.75-11.25	10.24
m2	11.50-13.60	12.43	28	10.25-12.25	10.94
m3	8.50-10.25	9.21	12	7.75-9.50	8.55
M1	15.50-19.25	16.30	38	11.50-13.75	11.68
M2	11.37-14.50	13.1	33	10.00-14.12	11.75
M3	8.00-9.50	8.73	7	8.50-10.25	9.07

**DESCRIPTION**

m1 (Plate I, Figs. 1, 2). The antero-central cusp is absent in forty-three and very weak in two specimens. In forty one specimens, there is a connection between the anteroconid

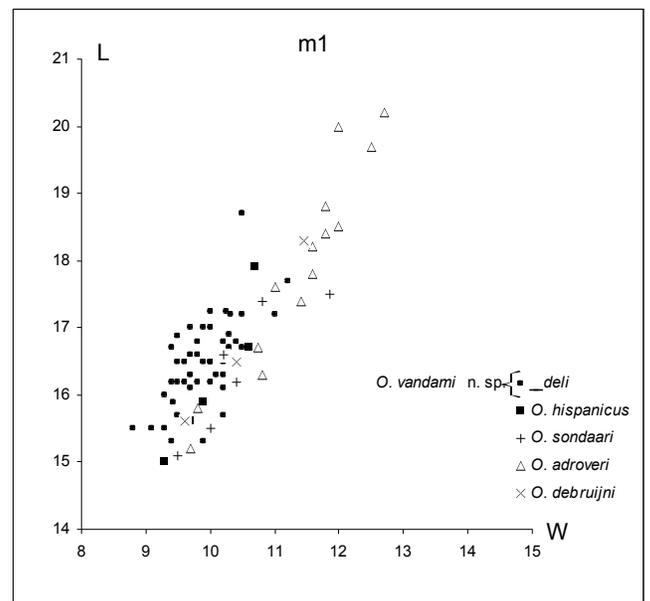
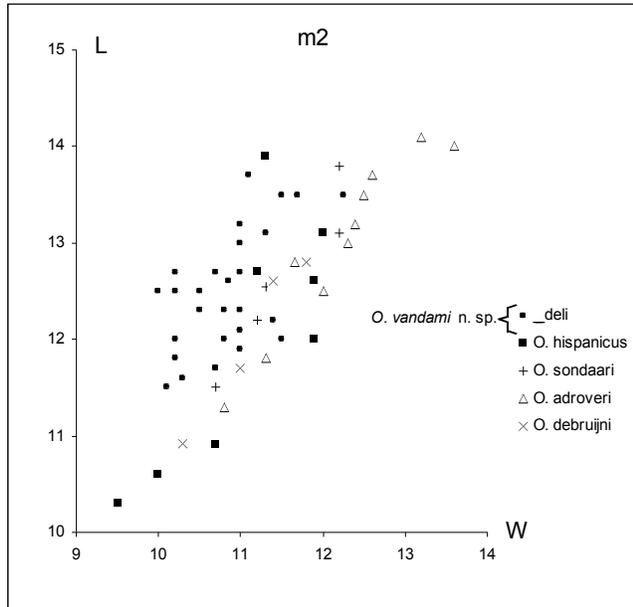


Fig. (2). Width-length scatter diagrams of m1 of *Occitanomys* species description from İğdeli, Peralejos, Valdecebro 4, Valdecebro 3, and Maritsa 1 localities.

cusps and the protoconid-metaconid pair in two specimens only, the lingual anteroconid is linked with the metaconid and in the remaining two specimens, although there is a ridge developed between the anteroconid cusps and the protoconid-metaconid pair, it is not long enough to connect

the two pairs. The longitudinal crest, is absent in twenty five of forty four specimens (56 %), is a crest-like in fourteen (32 %) or has developed as a crest in five (12 %). An oval or rounded posterior tubercle is either weak (16%) in seven of forty five specimens or well developed (84%) in thirty eight of forty five specimens and it is replaced by a low cingulum. A c1 is present in all specimens, in the form of a cusp or, sometimes as a ridge, and is connected to the hypoconid. The labial cingulum is low. The m1 is two-rooted.

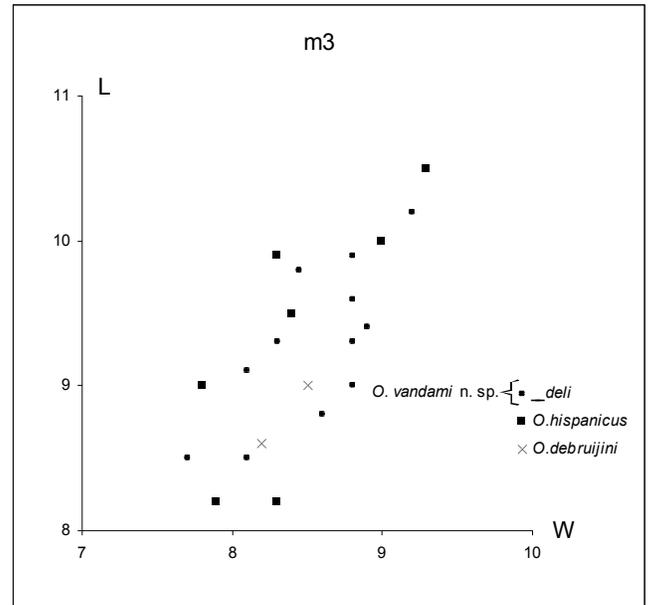


**Fig. (3).** Width-length scatter diagrams of m2 of *Occitanomys* species description from İğdeli, Peralejos, Valdecebro 4, Valdecebro 3, and Maritsa 1 localities.

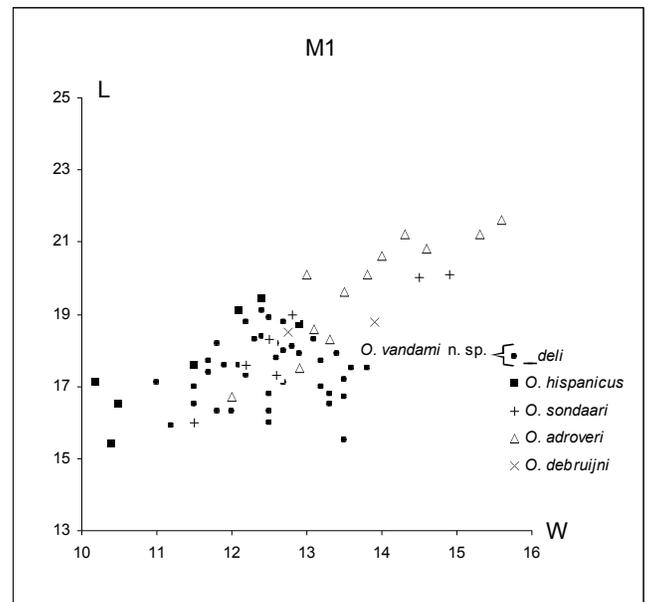
m2 (**Plate I**, Fig. 3). The antero-labial cusp is quite strong. The longitudinal crest has the form of a spur in sixteen (57%) of a longer ridge in five (18%) and is absent in seven (25%) specimens. The posterior tubercle is present as a cuspid in twenty as a low cingulum in the remaining eight specimens. Except one, in all the specimens there is a weak or average developed accessory cusp (this is not the c1), which is connected to the protoconid via the labial cingulum. It has two roots.

m3 (**Plate I**, Fig. 4). Antero- labial cusp is weakly developed. The ridge of hypoconid-entoconid is situated towards the lingual side of the tooth. It is two-rooted.

M1 (**Plate I**, Figs. 5, 6). Chewing surface is wide and the antero-lingual wall between the t1 and the t2 is concave. The central cusps (t2-t5-t8) line up longitudinally and are larger than the labial and lingual cusps (t3, t6 and t1, t4 respectively). The t1 is located posteriorly but the molars show variation in this feature: in some specimens the t1 is situated so far posteriorly that it is very far from the proloph position. The t1 is connected to the t2 through the t1 bis in twenty eight and in the other eight specimens, inspite of the presence of the t1 bis, it is isolated from the t2. The t1 is either isolated from the t5 (in the samples that are not worn). In all the specimens, there is a well developed t1 bis. The t3 either is curved backwards (in twentyfour specimens) or has a weak spur connecting it to the base of t5, in all but fourteen



**Fig. (4).** Width-length scatter diagrams of m3 of *Occitanomys* species description from İğdeli, Peralejos, Valdecebro 4, Valdecebro 3, and Maritsa 1 localities.

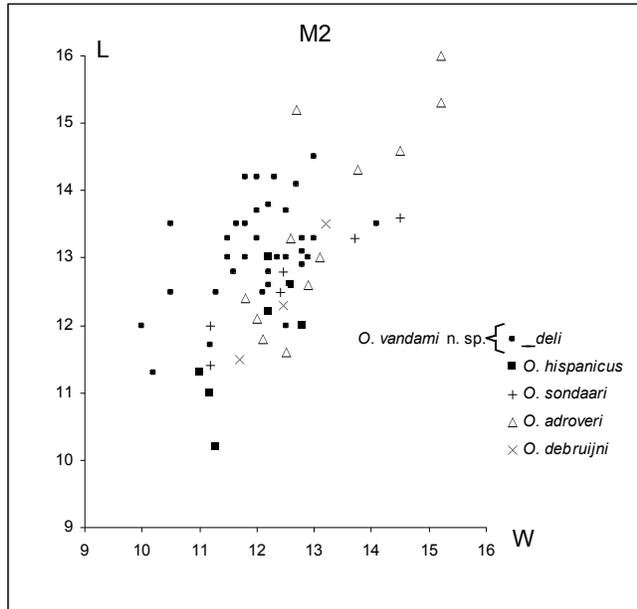


**Fig. (5).** Width-length scatter diagrams of M1 of *Occitanomys* species description from İğdeli, Peralejos, Valdecebro 4, Valdecebro 3, and Maritsa 1 localities.

specimens. The t4-t5-t6-t9 and t8 are connected with low ridges. The t12 is either developed as an apparent cusp (- in the unworn specimens (55%)) or as a narrow crest (13%) or is absent (22%). It has three roots.

M2 (**Plate I**, Figs. 7, 8). The chewing surface is wide. The t1 is large in all specimen but one in which it has the same size as the t3. The t1 is either connected to the t5 or isolated from it. The t4-t5-t6-t9 and t8 are connected with low ridges. There is no t12 is present in all but one specimen, on which it has the form of a low ridge connected to the t9. In twelve of sixteen samples, where the roots could be

observed there are four roots and in the remaining four there are three roots.



**Fig. (6).** Width-length scatter diagrams of M2 of *Occitanomys* species description from İğdeli, Peralejos, Valdecebro 4, Valdecebro 3, and Maritsa 1 localities.

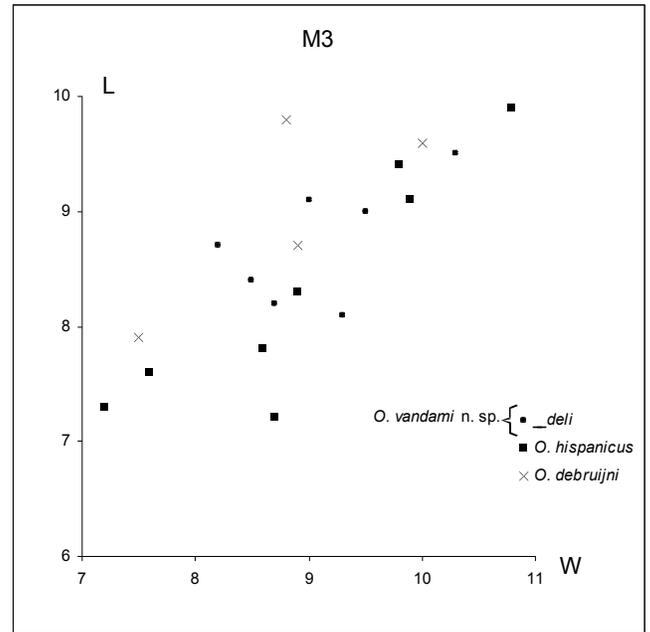
M3 (Plate I, Fig. 8). In all seven the t1 is large and connected to the t5. In all specimens the t4, t5 and t6 are fused. The t8 is isolated from the other cusps. It has three roots.

**DISCUSSION**

İğdeli specimens clearly show the characteristic features of *Occitanomys* due to its small length/width ratio in the M1 and M2 (Figs. 5, 6), the presence of a t1 bis and the high degree of stephanodonty presence of a t1 bis and the high degree of stephanodonty in the M1, the connection between the t1 and t5 in the M1, the connection between the t1 and t5 in all M1 and M2, lack of t12 (22%) or its weak development (13%) if there is any, the posterior placement of the t1 in the M1, the usual absence of antero-central cusp in the m1 and the presence of a longitudinal crest in some m1s and m2s. Additionally, it is included in the subgenus *Rhodomys* due to the posterior placement of the t1 in the M1 and its isolation from the t2 in 22% of the specimens, the presence of a t1 bis, the connection between the t5-t6-t9-t8 with low ridges in the M1 and the absence of longitudinal crest from almost half of the m1s [3-5].

*O. brailtoni* defined from Layna\*, Sete (\*type locality, Spain, Early Pliocene) [3], and Kardias and Ptolemais 1, 3 (Greece, Early Ruscianian) [4] localities differs from *O. (Rhodomys) vandami* due to its quite great size, the presence of high ridges linking the cusps in the M1 and the M2 and the absence of a t12 in the M1.

*O. alcalai* described from Peralejos E locality (Spain, Early Pliocene) [6, 7] differs from *O. (Rhodomys) vandami* by the presence of an antero-central cusp, in most of the m1s, the presence of a well developed c1 and other accessory cusps the presence of three roots in M2, and the connection between the t8 and t4 in the M3.



**Fig. (7).** Width-length scatter diagrams of M3 of *Occitanomys* species description from İğdeli, Peralejos, Valdecebro 4, Valdecebro 3, and Maritsa 1 localities.

*O. faillati* [2] described from Lo Fauras 6-7 (Castelnou [8-10], France, Late Miocene) differs from *O. (Rhodomys) vandami* due to the usual absence of a connection between the t6 and t9 and the absence of the t1 bis in the M1.

The variation field of the dimensions of *Rhodomys* species is mostly similar to each other (Figs. 2-7). The L/W ratio of *O. (Rhodomys) adroveri* is larger than others. However, *O. (Rhodomys) hispanicus* [5] described from Peralejos D, C, B, A, 4, Mesia del Barbo 2B, 2A localities (Spain, the Mio-Pliocene) differs from the İğdeli species (and more primitive than the İğdeli species) due to the absence of the t1bis and the usual absence of a connection between the t6 and t9 in the M1 and M2.

*O. (Rhodomys) sondaari* described from Valdecebro 4, Tortajada A, Alfambra and Crevillente 2, 4B, 5A localities (Spain, the Mio-Pliocene, the Lower Turolian) [5, 11] differs from the İğdeli species (and more primitive than the İğdeli species) due to the presence of a t1bis (at frequency 60%) in the M1 and M2, the presence of a connection between the t6 and t9 (at frequency 82%) in the M1 and M2 and the t4 and t8 are separated in the M1 and M2.

*O. (Rhodomys) adroveri* described from Valdecebro 3, Masada del Valle 7-5, Los Mansuetus, Conclud 2, Conclud Cerro de la Garita B, Villalba Baja 2, Masada del Valle 2-4, Tortajada ve Crevillente (Spain, the Mio-Pliocene, the Lower Turolian) [5, 11] differs from the İğdeli species due to the presence of a t1bis in the M1 and M2 (at frequency 80% in the M1 and at frequency 60 % in the M2), the t4 and t8 are separated in the M1 and M2 and M2 has three roots.

The İğdeli species is similar to *O. (Rhodomys) debruijini* described from Maritsa 1 (type locality, Greece, Upper Pliocene) [12] and Develi localities (Turkey, Pliocene) [13] but this species differs from the İğdeli species due to the more frequent separation between the t1 and t2 in the M1, the absence of a t12 in the M1 and M2, the presence

of three roots in the M2, the more frequent absence of a longitudinal crest in the m1 (80%), and the absence of a c1 and a posterior tubercle in the m2.

## PLATE I

*Occitanomys (Rhodomys) vandami* n. sp. from İğdeli, Turkey

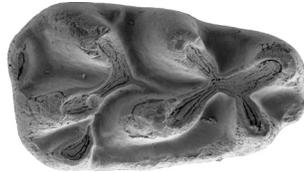


Fig. (1). dext m1 (İĞ. 241).

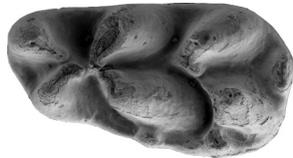


Fig. (2). sin m1 (İĞ. 273).

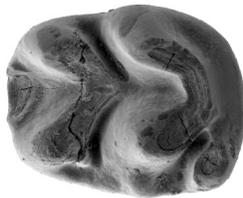


Fig. (3). dext m2 (İĞ. 291).



Fig. (4). sin m3 (İĞ. 330).

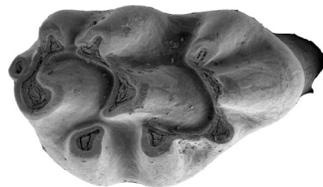


Fig. (5). dext M1, (holotype İĞ. 351).

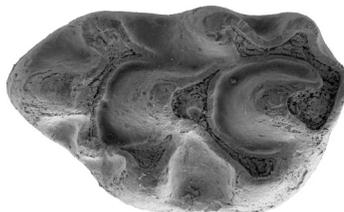


Fig. (6). sin M1 (İĞ. 372).

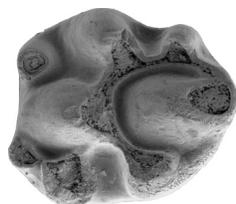


Fig. (7). sin M2 (İĞ. 391).



Fig. (8). sin M2-M3 (İĞ. 417).

The teeth are all figured by multiplied by 20.

1 mm.

## CONCLUSIONS

The study of the *Occitanomys* (Rodentia) material from İğdeli (Central Anatolia, Turkey) validates the presence of a new species, *O. (Rhodomys) vandami*, characterized by the presence of a t1 bis in the M1 and the M2, the separation of the t1 from the t2, or their connection *via* the t1 bis in the M1 and the connection between the t4-t8 and t6-t9.

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