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***Peridyromys darocensis* and *Peridyromys sondaari*, two new species of Gliridae (Rodentia, Mammalia) from the Lower Miocene (MN3-5) of the Calatayud-Daroca Basin, Zaragoza, Spain**

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Two new Gliridae (Dormice) species, *Peridyromys darocensis* and *P. sondaari*, are described from the Lower Miocene of the Villafeliche area in the Calatayud-Daroca Basin. The teeth of *P. darocensis* are relatively small and their pattern is more complex than that of *P. murinus* from the Lower Miocene of Western Europe and more simple than that of *P. sondaari*. The teeth of *P. sondaari* are slightly larger and more complex than those of *P. darocensis*. The latter species is the ancestor of *P. sondaari*. The stratigraphic range of this lineage is from latest MN3 to earliest MN5 and covers approximately one million years.

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note by the editors: sadly, professor Remmert Daams died suddenly and unexpectedly on 1 May 1999

INTRODUCTION

Excavations carried out by the author and various colleagues in the continental Miocene deposits of the Calatayud-Daroca Basin since 1976 revealed the presence of more than hundred localities with fossil micromammals (see Daams *et al.* in press). A small part of the material has been published, and most of it is under study now. This paper is one of the contributions to the systematical study of the rodent faunas.

The type locality of *Peridyromys darocensis* n. sp. and *P. sondaari* n. sp. are San Roque 4A and Vargas 2B respectively. San Roque is situated at some 200 m ENE of the village of Villafeliche whereas Vargas 2B is present at

the northern border of the Rambla de Vargas, about 1 km East of Villafeliche (see Daams *et al.*, in press). Representatives of the *P. daro - censis - P. sondaari* lineage are found in eight more localities from the same area, covering local zones A, C, and Db (late MN3-MN4-early MN5). These localities are Olmo Redondo 5, Olmo Redondo 8, Vargas 2A, La Col A, Fuente Sierra 2, Fuente Sierra 3, Olmo Redondo 9 and La Col D. Daams (1989) described *Peridyromys* aff. *jaegeri* from Olmo Redondo 5, 8 and 9 which are now allocated to *P. sondaari* n. sp. For a more precise geographical and stratigraphical position of the localities, the reader is referred to Daams *et al.* (in press).

SYSTEMATICAL DESCRIPTION

Gliridae THOMAS, 1897

Myomiminae DAAMS, 1981

Peridyromys darocensis n. sp.

(Plate 1, figs. 1-20)

Holotype: M2 dext. cat. nr. SR4A-949

(Plate 1, fig. 4)

Type locality: San Roque 4A**Type level:** Local Zone A, Upper Ramblian
(Lower Miocene)**Derivatio nominis:** *darocensis* - after Daroca, the small medieval town in the south of Zaragoza that gave us such a warm hospitality during our numerous field campaigns.**Material and measurements:** see Table 1

Table 1. Material and measurements.

Elemt.	Length				Width				Locality
	N	min	mean	max	N	min	mean	max	
P ⁴	1		9.3		1		11.1		La Col A
M ^{1,2}	2	11.4	11.6	11.7	2	13.1	13.5	13.8	La Col D
	3	11.5	11.8	12.3	2	13.1	13.6	14.0	Olmo Redondo 9
	4	11.2	11.7	11.9	3	13.2	13.5	13.6	Fuente Sierra 3
	11	10.8	11.4	12.0	8	12.4	13.0	13.5	VR2B
	1		11.7		1		14.1		La Col A
	3	11.2	11.4	11.6	2	12.9	13.3	13.6	VR2A
	3	11.2	11.3	11.4	1		12.8		Olmo Redondo 8
	5	10.9	11.4	12.2	3	12.6	13.0	13.5	Olmo Redondo 5
	36	10.1	11.0	11.8	35	11.8	13.1	14.0	San Roque 4A
M ³	3	8.5	9.0	9.6	3	11.1	11.5	11.9	Vargas 2B
	1		9.5		1		11.9		Olmo Redondo 8
	1		8.6		1		12.1		Olmo Redondo 5
	9	8.6	9.1	9.6	7	11.6	12.0	12.5	San Roque 4A
M ₁	1		11.9		-				La Col D
	1		12.0		-				Olmo Redondo 9
	2	11.6	11.9	12.2	2	11.0	11.0	11.0	Fuente Sierra 3
	4	11.4	11.8	12.1	3	10.7	10.8	11.0	Vargas 2B
	1		12.5						Olmo Redondo 8
	2	11.9	12.3	12.6	2	10.5	10.8	11.1	Olmo Redondo 5
	22	10.6	11.4	12.4	20	9.9	11.2	11.7	San Roque 4A
M ₂	1		12.5		1		12.0		La Col D
	1		12.2		1		11.6		Olmo Redondo 9
	1		12.3				11.9		Fuente Sierra 3
	4	12.2	12.6	12.9	4	11.3	11.8	12.3	Vargas 2B
	2	12.5	12.6	12.6	2	11.5	11.6	11.7	La Col A
	2	12.1	12.3	12.4	2	12.2	12.6	13.0	Olmo Redondo 8
	1		12.7		1		12.2		Olmo Redondo 5
	13	11.3	11.8	12.2	10	11.5	12.1	12.9	San Roque 4A
M ₃	1		11.1		1		10.8		Fuente Sierra 2
	2	11.3	11.5	11.6	2	10.2	10.3	10.3	Vargas 2B
	1		11.3		1		10.4		La Col A
	2	10.7	10.9	11.1	2	9.3	9.7	10.1	Vargas 2A
	1		12.0				10.7		Olmo Redondo 8
	1		12.6		1		11.8		Olmo Redondo 5
	5	10.4	11.1	11.4	5	9.7	10.6	11.2	San Roque 4A

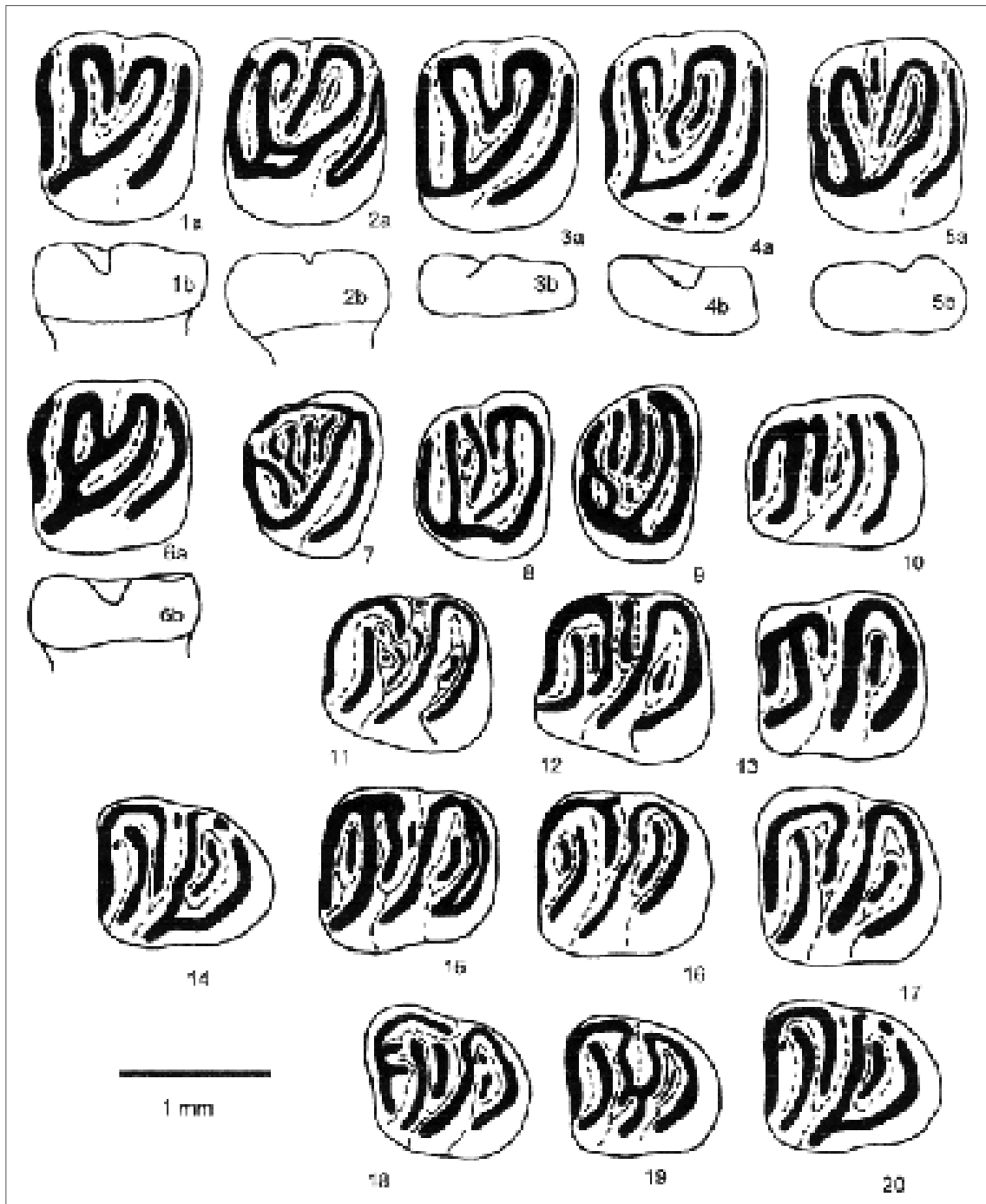


Plate 1 *Peridyromys darocensis* n. sp. from San Roque 4A; Fig. **1**. M1 dext., cat nr. SR4A-950; Fig. **2**. M1 dext., cat nr. SR4A-177 (inverse); Fig. **3**. M1 dext., cat nr. SR4A-948; Fig. **4**. M2 dext., cat nr. SR4A-949 (holotype); Fig. **5**. M2 dext., cat nr. SR4A-188 (inverse); Fig. **6**. M1 dext., cat nr. SR4A-433; Fig. **7**. M3 dext., cat nr. SR4A-218; Fig. **8**. M3 dext., cat nr. SR4A-219; Fig. **9**. M3 dext., cat nr. SR4A-223; Fig. **10**. m1 sin., cat.nr. SR4A-230; Fig. **11**. m1 sin., cat.nr. SR4A-233; Fig. **12**. m1 sin., cat.nr. SR4A-234; Fig. **13**. M1 sin., cat.nr. SR4A-240 (inverse); Fig. **14**. m3 sin., cat.nr. SR4A-259; Fig. **15**. m2 sin., cat.nr. SR4A-249; Fig. **16**. m2 sin., cat.nr. SR4A-250; Fig. **17**. m2 sin., cat.nr. SR4A-251; Fig. **18**. m3 sin., cat.nr. SR4A-264 (inverse); Fig. **19**. m3 sin., cat.nr. SR4A-261; Fig. **20**. m3 sin., cat.nr. SR4A-259. Fig **1b** - **6b** are lingual views

Diagnosis: *A Peridyromys* species with a slightly complex and a moderately chaotic dental pattern.

Differential diagnosis: *P. darocensis* n. sp. differs from *P. murinus* (POMEL, 1853) from the Lower Miocene (MN1-MN5) of Western Europe (see Daams 1981) by its more complex dental pattern. *P. darocensis* n. sp. differs from *P. jaegeri* AGUILAR, 1974 from the Lower Miocene (MN1) of Les Cévennes and La Paillade (France) by its larger size, and by the presence of an accessory ridge in the anterior valley of m1. *P. darocensis* n. sp. differs from *P. turbatus* DAAMS & DE VISSER, 1990 in Alvarez *et al.* (1990) from the Lower Miocene (MN2b) of San Juan (Ebro Basin, Spain) by its slightly larger size and by its less chaotic ridge pattern. *P. darocensis* n. sp. differs from *P. aquatilis* DE BRUIJN & MOLTZER, 1974 from the Lower Miocene (MN3-MN4 ?) of Rubielos de Mora (Teruel, Spain) by its larger size, by its slightly more complex and more chaotic dental pattern, and by the presence of an accessory ridge in the anterior valley of m1.

Description of the type material of *P. darocensis* n. sp.

M 1, 2 - The anteroloph is an isolated ridge. The trigone has an oblique V-shape in M1, and tends to be more U-shaped in the M2. The two centrolophs end freely in the central valley although in 4 out of 38 specimens they are fused. The anterior centroloph is longer than the posterior one, with the exception of 2 M1. Extra ridges are absent in 4 out of 18 M1, and in one out of 20 M2. The anterior extra ridge between the protoloph and the anterior centroloph is present in 12 M1 and 13 M2. A second accessory ridge may be present between the two centrolophs near the labial border in two M1 and 6 M2. The posteroloph is either connected to, or isolated from the protocone. Low cusps may be present at the lingual border.

M3 - The anteroloph is either isolated from the protocone, or connected to it by a low and narrow ridge. Labial the anteroloph may be either isolated from or connected to the paracone. Behind the protoloph the pattern may be chaotic. Four to six ridges of variable length are present representing the two centrolophs, metaloph, posteroloph and one or two extra ridges.

m1 - The anterolophid may be or may not be connected to the protoconid. The metalophid is either isolated from or connected to the metaconid. The centrolophid varies from short to relatively long, it may have an irregular labial end, but it is never longer than 75 % of the tooth width. Mesolophid and posterolophid meet at the entoconid, although in some specimens this connection may be low. Between one and three extra ridges are present, either of which may be situated in the posterior valley, or at both sides of the centrolophid. Accessory ridges between the anterolophid and metalophid are absent. Two roots are present.

m2 - The anterolophid is either separated from the protoconid or a very low connection may be present. The metalophid, centrolophid, mesolophid and posterolophid are as in m1. The number of extra ridges is as in m1 too, but in m2 one of these may be situated in the anterior valley. Two roots are present.

m3 - The anterolophid is either separated from the protoconid or a very low connection may be present. The metalophid, centrolophid, mesolophid and posterolophid are as in m1 and m2. The posterolophid may be connected to the labial end of the mesolophid. Either one or two extra ridges are present. There is always one in the posterior valley, and the other one may be situated between the anterolophid and the metalophid. Two roots are present.

***Peridyromys sondaari* n. sp.**

(Plate 2, figs. 1-12)

Holotype: M1 dext. cat. nr. VR2B-338

(Plate 2, fig. 3)

Material and measurements: see Table 1

Type locality: Vargas 2B

Type level: Local Zone Da, MN5, Middle Aragonian (Lower Miocene)

Derivatio nominis: Who else than our jubilee Paul Sondaar who gave us such interesting and cordial classes in mammalian paleontology, and who took us on paleontology excursions beyond the official program.

Diagnosis: A *Peridyromys* species with a very complex and chaotic dental pattern. The lower molars generally have an endolophid.

Differential diagnosis: *P. sondaari* n. sp. differs from *P. jaegeri* AGUILAR, 1974 from the Lower Miocene (MN1) of South France by its larger size, by its more complex and chaotically ridge pattern and by the presence of an endolophid in the lower molars.

P. sondaari n. sp. differs from *P. darocensis* n. sp. from San Roque 4A (this paper) by its more complicated dental pattern, by the presence of an endolophid in the lower molars and by its slightly more slender lower molars.

P. sondaari n. sp. differs from *P. turbatus* DAAMS & DE VISSER, 1990 in Alvarez *et al.* (1990) from the Lower Miocene (MN2b) of San Juan, Ebro Basin by its somewhat larger size, by its more complicated dental pattern and by the presence of an endolophid in the lower molars.

Description of the type material of

***P. sondaari* n. sp.**

P4 - A well-developed and long anteroloph joins the paracone either just below the occlusal surface or at the same height. The other end reaches the antero-lingual side of

the tooth. In two out of the three specimens a short longitudinal ridge connects the middle part of the anteroloph to the protoloph. A relatively long posterior centroloph is present which is connected to the metacone. The long posteroloph is connected to the metacone, and lingually there may be a narrow and shallow furrow before it reaches the protocone. One specimen has no extra ridges, one specimen has a tiny accessory ridge between the posterior centroloph and the metaloph, and the third case has two accessory ridges; one between the protoloph and the posterior centroloph, and one between the posterior centroloph and the metaloph.

M1 - The anteroloph is an isolated ridge of which the lingual end may extend as far as the postero-lingual corner of the tooth (Plate 2, fig. 1a). The trigone is relatively oblique since the protocone is situated in the utmost postero-lingual corner of the tooth. Two centrolophs are present whose lingual ends are irregularly shaped. In the specimens with freely ending centrolophs, the anterior one is longer than the posterior one. The posteroloph joins the protocone, and at the labial side it may be separated from the metacone by a narrow and shallow furrow. Three extra ridges are present; one between the protoloph and the anterior centroloph, one between the two centrolophs, and one between the posterior centroloph and the metaloph. In most specimens the ridge pattern of the central part is chaotically.

M2 - Basically the dental pattern is similar to that of M1 with some slight differences. The anteroloph joins the paracone at the labial side, it does not extend lingually as far as in M1 and in various specimens this ridge widens to join the middle part of the protoloph (Plate 2, fig.3a). One specimen has four, and another has five extra ridges inside the trigone instead of three in M1.

M3 - This element is relatively short. The anteroloph does not join the protocone. In

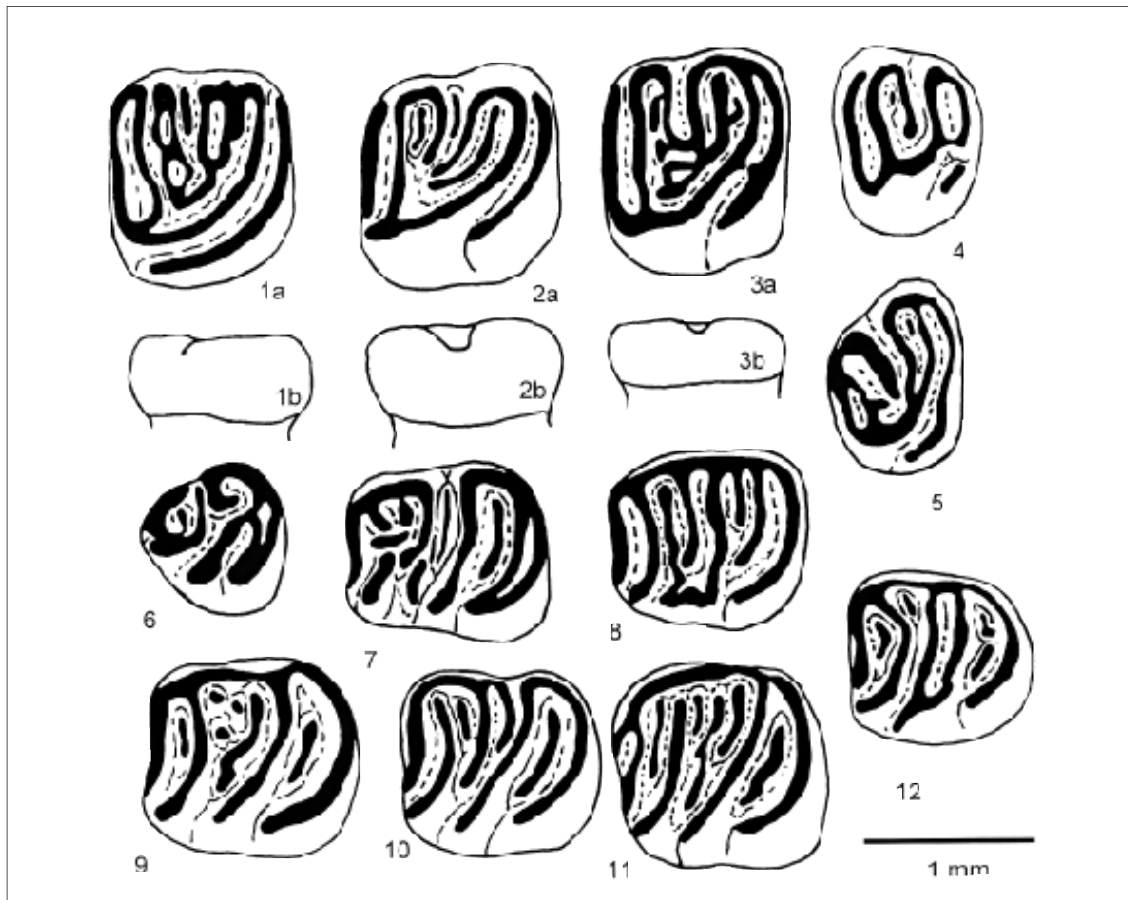


Plate 2 *Peidyromys sondaari* n. sp. from Vargas 2B; Fig. 1. M1 dext., cat nr:VR2B-334 (inverse); Fig. 2. M2 dext., cat nr:VR2B-336; Fig. 3. M2 dext., cat nr:VR2B-338 (holotype); Fig. 4. P4 dext., cat nr:VR2B-328 (inverse); Fig. 5. M3 dext., cat nr:VR2B-343; Fig. 6. p4 dext., cat nr:VR2B-345; Fig. 7. m1 sin., cat nr:VR2B-350 (inverse); Fig. 8. m1 sin., cat nr:VR2B-; Fig. 9. m2 sin., cat nr:VR2B-354 (inverse); Fig. 10. m2 sin., cat nr:VR2B-352; Fig. 11. m2 sin., cat nr:VR2B-351; Fig. 12. m3 sin., cat nr:VR2B-356; Fig. 1b - 3b are lingual views.

one out of the two specimens the anteroloph widens to meet the protocone. This phenomenon is present in M2 and P4 as well. The posterior centroloph is longer than the anterior one, and the central extra ridge is missing.

p4 - Two specimens with relatively chaotically ridge pattern are present (Plate 2, fig. 6).

m1 - The anterolophid joins the metalophid labial. The metalophid may be irregularly shaped. The long centrolophid meets the labial end of the mesolophid. The labial ends of the main ridges tend to be elongated thus

forming a continuous wall. In two out of four specimens there is a continuous lingual wall as well. Three irregularly shaped accessory ridges are present; one at either side of the centrolophid, and one in the posterior valley. Two roots are present.

m2 - The anterolophid is separated from the protoconid. The long centrolophid meets the labial end of the mesolophid in two out of five specimens. There is no tendency to form a labial wall such as in m1. A continuous endolophid is present in all specimens. Three irregularly shaped accessory ridges are pre-

sent; one at either side of the centrolophid, and one in the posterior valley. In one specimen a fourth accessory ridge is present in the anterior valley. The ridge pattern may be very chaotically in the center of the tooth. Two roots are present.

m3 - The anterolophid is separated from the protoconid. The long centrolophid meets the labial end of the mesolophid. There is no tendency to form a labial wall such as in m1. A continuous endolophid is present in both specimens. Three irregularly shaped accessory ridges are present; one in the anterior

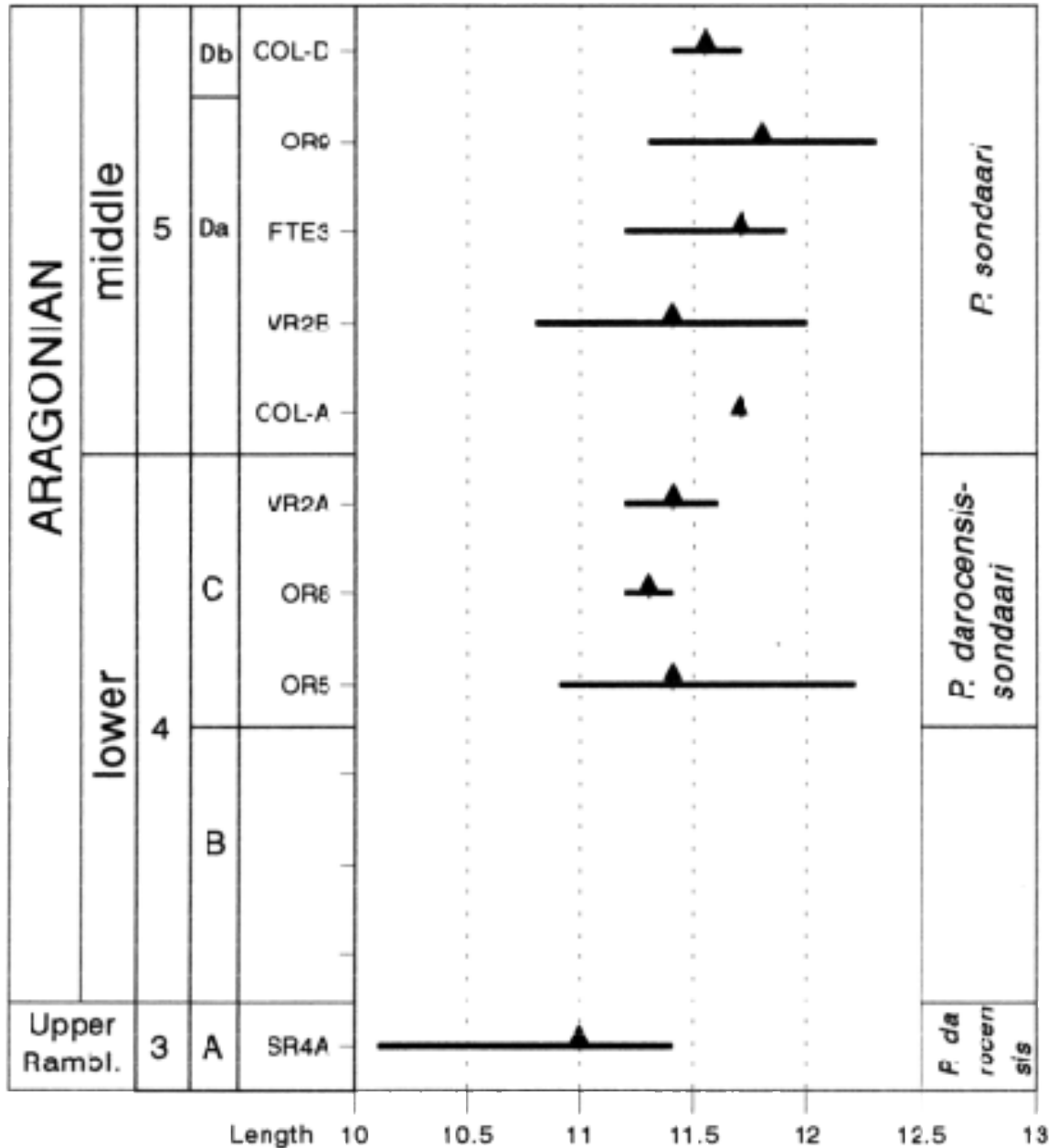


Figure 1 Length ranges of M1,2 in 0.1 mm units of the *Peidyromys darocensissondaari* lineage from the Lower Miocene of the Villafeliche area in the Calatayud-Daroca Basin. The third and fourth columns represent MN units and local biozones, respectively

valley, one beyond the centrolophid and one in the posterior valley. In the other specimen a fourth accessory ridge is present behind the metalophid. The ridge pattern is not as chaotically in the center of the tooth as in m1,2. Two roots are present.

DISCUSSION

The ancestor of *P. darocensis* is probably *Peridyromys murinus* from the Lower Miocene of Western Europe since its dental pattern and tooth size are of similar characteristics. In San Roque 4A *P. murinus* is also present and the molars can be distinguished from the ones of *P. darocensis* by their much simpler dental pattern such as the absence of accessory ridges and the posterior centroloph. I was not able to distinguish premolars of the new species in the abundant dormouse material since the ones of *Microdyromys legidensis*, *Peridyromys murinus*, and *Pseudodyromys ibericus* may have similar morphologies.

P. sondaari n. sp. is the same species described by Daams (1989) as *Peridyromys* aff. *jaegeri* from Olmo Redondo 9 from the Lower Aragonian (local Zone Da; early MN5) of the Villafeliche area in the Calatayud-Daroca Basin. Two other -very-small assemblages (Olmo Redondo 5 and 8) from local zone C (MN4) from the same area were described as *P. aff. jaegeri* as well by Daams (1989). It now appears that these two assemblages are intermediate in morphology between *P. darocensis* and *P. sondaari* since the upper molars fall in the morphological range of variation of *P. darocensis*, and the lower ones in that of *P. sondaari*. *P. darocensis* is considered to be the ancestor of *P. sondaari*. The evolutionary trends would be towards slightly larger size (Fig. 1), towards slightly more slender lower molars, towards

the formation of an endolophid in the lower molars, and towards a more complex dental pattern. The representatives of this lineage form a minor part of the faunas in which they are found. In the nine, well-represented faunas from local zone B representatives are even absent.

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