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Plioviverrops faventinus n. sp., a new carnivore of late Messinian age

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SUMMARY — The Plioviverrops *finds collected in the Monticino quarry, near the village of Brisighella (Faenza, Italy), are referred to a new species,* P. faventinus. *The fossils come from fillings of karst cavities in gypsum beds. The evaporite section is uncomformably overlain by a thin cover of continental to brackish deposits of late Messinian age.*

P. faventinus *n. sp., is as large in size as* Plioviverrops guerini, *a Turolian species of Spain, but it shows dental features closer to* Plioviverrops orbignyi, *a smaller species of the Turolian of Greece.* P. faventinus *n. sp. was probably derived from* P. orbignyi, *by increasing its size and by progressive molarization of its premolars.*

RIASSUNTO — [Plioviverrops faventinus n. sp., un nuovo carnivoro del Messiniano superiore] — *I resti di* Plioviverrops *trovati nella cava Monticino, ubicata presso Brisighella (Faenza), sono attribuiti ad una nuova specie,* P. faventinus *n. sp. I fossili sono stati raccolti in riempimenti di cavità carsiche presenti nei banchi di gesso. La sezione evaporitica è ricoperta in discordanza da un sottile livello di depositi da continentali a salmastri del Messiniano superiore.*

P. faventinus *n. sp. ha le dimensioni di* Plioviverrops guerini, *una specie turoliana della Spagna, ma caratteri della dentatura più vicini a* Plioviverrops orbignyi, *una specie di taglia minore del Turoliano della Grecia.* P. faventinus *n. sp. è probabilmente derivato da* P. orbignyi, *differenziandosi per l'aumento della taglia e la più spinta molarizzazione dei premolari.*

PREFACE

The fossil finds come from fillings of karstic cavities in a gypsum section, uncomformably overlain by a very thin cover of continental to brackish deposits of the late Messinian. The section outcrops in the Monticino gypsum quarry near Brisighella (Faenza, Italy). An account of local mapping, facies analysis, and structural geology was published by Marabini & Vai (1985).

The bulk of the *Plioviverrops* finds, some represented by portions of connected skeletons, was collected from the fissure filling named site BRS5; other finds come from fillings BRS2, 3, 4, 9, 10, 16 and 19. The distribution of taxa in the sites is reported in Tab. 2.

A discussion of the genus *Plioviverrops* was carried out by De Beaumont & Mein (1972). They included in this genus some fossils from La Grive-Saint-Alban (the maxilla determined by Viret, 1951, as *Jourdanictis*, and a P^4 and M_1), and some teeth determined as *Progenetta* sp. (Mein, 1958; De Beaumont, 1967), from Vieux-Collonges. These two new species, *P. gervaisi* from the older locality and *P. gaudryi* from La Grive, represent two morphological stages of a phylogenetic lineage, issuing from *Herpestides* and proceeding as far as *P. orbignyi* from Pikermi and Samos. The lineage is characterized by a progressive change in molars that were selected for puncturing functions. The premolars tend to become stouter and to be molarized. *Plioviverrops guerini* of the Turolian of Spain (Los Mansuetos, Concud and Piera di Hostalets) (De Villalta & Crusafont, 1945; Crusafont & Petter, 1969) is the latest known product of a later conservative branch, as suggested by its increased size but by a dental morphology which remains very similar to that of the La Grive fossil.

The finds of Brisighella prolong the *Plioviverrops* lineage into the Messinian through this new, more derived species. The combination of molars with very tall but weak conids and the stout premolars suggests that these carnivores lived on small vertebrate prey and on carrion.

SYSTEMATIC DESCRIPTION

Family Hyaenidae
Genus Plioviverrops Kretzoï, 1937-38.

Plioviverrops faventinus n. sp.
Pl. 1, figs. 1-19

Holotype — Fragmentary mandible from site BRS5 (Pl 1, figs. 1-2).

Dimensions (in mm)

		M_2	M_1	P_4	P_3
Right branch	L	7.4	11.3	9.5	8.5
	W	5.2	5.7	4.6	4.3
Left branch	L	7.3	11.4	9.6	
	W	5.2	5.6	4.8	

Hypodigm — Site BRS5 - a crushed muzzle with mandible (Pl. 1, fig. 6) and a left mandibular branch, still enclosed in sediment; n. 6 fragments of mandibles without teeth; maxillary with left (L. 11.9 - W 8.0) and right (11.6 - 7.7) P^4 (Pl. 1, fig. 13); fragment of right mandibular branch with M_2 (7.6 - 5.4), M_1 (11.5 - 5.6), P_4 (9.4 - 4.8) and P_3 (9.0 - 4.1) (Pl. 1, fig. 4); left mandibular branch with C (5.3 - 5.2) and P_3 (9.8 - 4.5) (Pl. 1, fig. 3); n. 3 right M_2 (8.0 - 5.9, 7.4 - 5.4, 7.5 - 5.5); left M_2 (7.8 - 5.4); n. 2 left M_1 (11.3 - 5.2, Pl. 1, fig. 11; 10.4 - 4.8); n. 4 right M_1 (11.5 - 5.3, Pl. 1, fig. 12; 12.0 - 5.5; 10.6 - 5.1; 11.2 - 5.4); right P_4 (10.5 - 4.8, Pl. 1, fig. 9); right P_3 (9.8 - 4.2, Pl. 1, fig. 10); n. 3 left, lower C (6.0 - 5.4, Pl. 1, fig. 8; 6.2 - 5.3; 6.5 - 5.8); n.2 right M^2 (5.6 - 7.7, Pl. 1, fig. 19; 5.6 - 8.3); left M^1 (7.3 - 9.4, Pl. 1, fig. 18); n.3 right M^1 (7.2 - 9.9, 7.2 - 8.9, 7.6 - 10.0); a fragmentary right M^1; n. 2 right P^4 (11.4 - 8.2, Pl. 1, fig. 14; 11.5 - 8.2); n. 2 left P^4 (11.2 - 8.3, 11.8 - 8.2); n. 2 left P^3 (8.7 - 5.7, 8.6 - 5.6); n. 3 right P^3 (9.2 - 5.9, Pl. 1, fig. 16; 8.5 - 5.4; 9.8 - 6.2); n. 2 left P^2 (7.2 - 4.0, 7.4 - 4.8); right P^2 (7.0 - 4.0, Pl. 1, fig. 17); n. 3 left, upper C (6.6 - 5.0, 7.0 - 6.2, 6.1 - 4.6); n. 3 right, upper C (6.3 - 4.8, Pl. 1, fig. 7; 7.0 - 5.3; 6.2 - 4.7); right DP_4 (Pl. 1, fig. 5).

Other material — Site BRS2 - a right mandibular branch without teeth.

Site BRS3 - left P^4 (12.8 - 9.1); left, upper C (6.0 - 5.5).
Site BRS4 - right M_1 (11.1 - 5.0).
Site BRS9 - left P^3 (8.6 - 5.8, pl. 1 fig. 15); n. 2 right P^3 (9.8 - 6.2, 9.2 - x).
Site BRS10 - right mandibular branch without teeth.
Site BRS16 - fragmentary left M_1.
Site BRS19 - right mandibular branch without teeth; left, upper (6.8 - 4.3).

Repository — All the material is preserved at the Museo Civico di Scienze Naturali, Faenza (Italy).

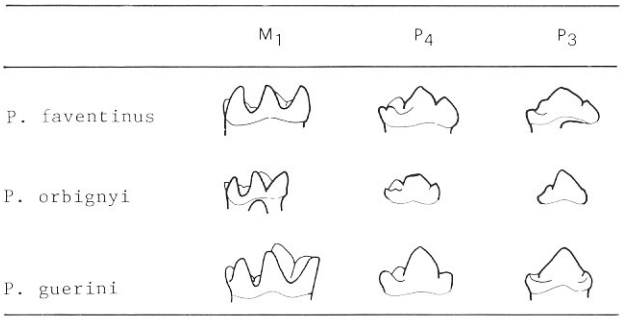
Type locality — Monticino gypsum quarry, Site BRS5 - Brisighella, Faenza (Italy).

Horizon — Late Messinian; late Turolian, Zone MN 13, in European mammal biochronology.

Etymology — From the town Faenza.

Diagnosis — A fox sized species of the genus *Plioviverrops*, differing from all other *Plioviverrops* species in the following progressive features: M_1 with a developed entoconid, which tends to be as large as the metaconid, and with a relatively low protoconid, which does not surpass the other conids in height; P_4 with a strong anterior accessory cusp; P_3 with a clear but small talonid and a feeble but distinct anterior accessory cusp; P^3 and P^2 with a marked accessory cusp in the strong, more or less notched, lingual cingulum; the mandible is strong and the masseteric fossa deep; a posterior mental foramen is sometimes present, but whenever present its size is highly variable.

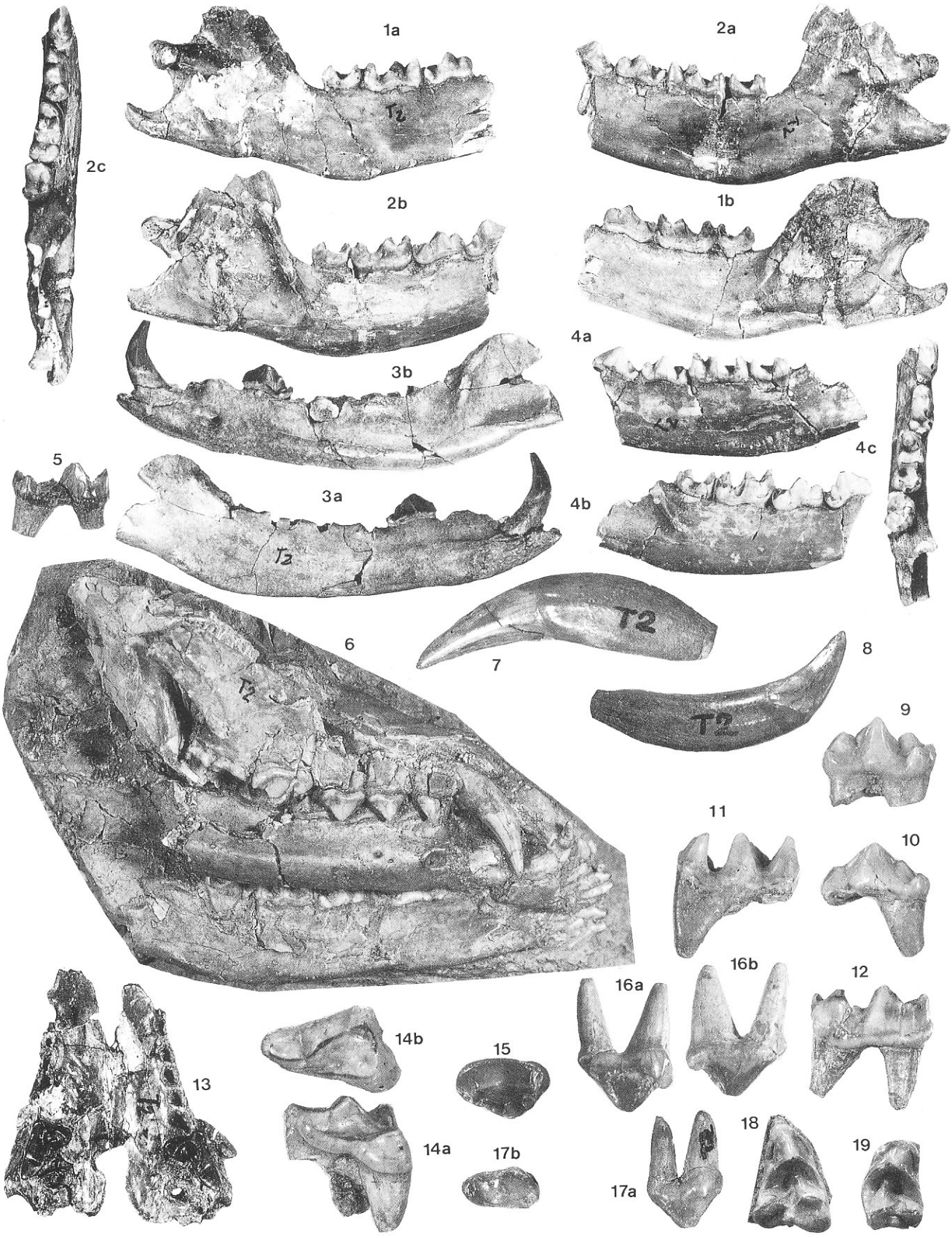
Discussion — *P. faventinus* n. sp. is as large in size as *P. guerini*, but it differs from the spanish species in a number of dental features. M_1 shows a relatively lower protoconid, and a much higher entoconid, which is almost of the same size as the metaconid; P_4 has an anterior accessory cusp which is clearly much more



Text-fig. 1 - Teeth are drawn in lingual view at about natural size.

EXPLANATION OF PLATE 1

Figs. 1-19 - *Plioviverrops faventinus* n. sp.: 1-2) holotype, left and right mandibular branches of the same individual, BRS 5-34: a-lingual, b-labial, c-occlusal views, x1; 3) left mandibular branch, BRS 5- 30: a-lingual, b-labial views, x1; 4) right mandibular branch, BRS 5-158: a-lingual, b-labial, c-occlusal views, x1; 5) right DP_4, BRS 5, x2; 6) fragment of skull with mandible, BRS 5, x1; 7) right upper C, BRS 5-294, x2; 8) left lower C, BRS 5-61, x2; 9) right P_4, BRS 5-168, x2; 10) right P_3, BRS 5-367, x2; 11) left M_1, BRS 5-54, x2; 12) right M_1, BRS 5-169, x2, 13) palatal view, BRS 5-33, x1, 14) right P^4, BRS 5-55: a-lingual, b-occlusal views; x2, 15) left P^3, BRS 9-4: occlusal view, x2; 16) right P^3, BRS 5-300: a-lingual, b-labial views, x2; 17) right P^2, BRS 5-278: a-lingual, b-occlusal views, x2; 18) left M^1, BRS 5-313: occlusal view, x2; 19) right M^2, BRS 5-57: occlusal view, x2.


1a
2a
2c
2b
1b
3b
4a
4c
5
3a
4b
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8
9
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16b
12
16a
13
14b
15
14a
17b
17a
18
19

developed, and P_3 displays a small but fully developed talonid which is not evident in *P. guerini*. In these characters *P. faventinus* is closer to the smaller *P. orbignyi*, but is more progressive in the molarization of its premolars (Text-fig. 1).

At present, it is reasonable to regard *P. faventinus* n. sp. as a species derived from *P. orbignyi*, since the tooth synapomorphies give more reliable information on the phylogenetic relationships than does size alone.

MN Zones	Localities	*Plioviverrops* species
13	Brisighella (Faenza)	*P. faventinus* n. sp.
12	Pikermi, Samos, Los Mansuetos, Concud	*P. orbignyi, P. guerini*
11	Piera	*P. guerini*
7	La Grive	*P. gaudryi*
4b	Vieux-Collonges	*P. gervaisi*

Tab. 1 — Stratigraphic range of the genus *Plioviverrops*.

BRS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	19	20
Galerix sp.		?	+	+	+						+		+					+	
Postpalaerinaceus sp.					+				+										
Episoriculus aff. *gibberodon*		+	+	+	+	+		+	+		+	+							+
Soricidae indet. (small size)																			+
Megaderma gr. *vireti-mediterraneum*			+		+														
Rhinolophidae indet.		+			+	+													+
Vespertilionidae indet.			+		+														
Chiroptera indet.							+												
Colobinae cf. *Mesopithecus*	+																		
cf. Gomphotheriidae																		+	
Plioviverrops faventinus n. sp.		+	+	+	+					+						+		+	
Hyaenidae indet.			+		?														?
Canidae indet.					+														
Orycteropus sp.				?	+														?
Dicerorhinus cf. *megarhinus*	+																		
Hipparion sp.	+		+		+				+						+				
Samotragus occidentalis n. sp.	+	+		?	+	?		+	+	+					+	+	+	+	?
Bovinae cf. *Parabos*	+				+											+		+	
Bovidae indet.			+	+															
Cervidae indet. (small size)				+															
Suidae indet.	+																		
Hystrix sp.					+	?						+							
Stephanomys debruijni n. sp.	+	+	+	+	+	+	+	+	+		+	+		+	+	+	+		+
Paraethomys anomalus	+	+	+		+	+			+		+	+				+	+		+
Castillomys benericettii n. sp.	+	+		+	+	+		+	+		+	+					+		+
Occitanomys sp.								+									+		
Apodemus cf. *gudrunae*			+	+	+	+	+	?									+		+
Cricetus cf. *barrierei*			+			+													
Ruscinomys cf. *lasallei*				+	+	+			+								+		
Myomimus sp.						?													
Atlantoxerus cf. *rhodius*			+			+													
Hylopetes sp.						+													
Trischizolagus cf. *maritsae*		+		+	+	+		+	+						+		+	+	+
Prolagus cf. *sorbinii*	+		+	+	+	+		+	+					+			+		+

Tab. 2 - Distribution of taxa in the sites of the Monticino quarry.

P. guerini and *P. orbignyi* are probably sister species, living at the same time in Southern Europe, the former with a western (Spain) and the latter with an eastern (Greece) range. Therefore, it is very probable that *P. faventinus* spread into Italy during the Messinian time from an eastern area.

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