Estudios Geológicos, 62 (1)
enero-diciembre 2006, 249-256
ISSN: 0367-0449

Miophasianus and *Palaeoperdix* (Galliformes, Aves) from three Miocene localities of Spain

A. Sánchez Marco

ABSTRACT

The occurrence of two genus of phasianids in some Miocene localities of Spain are reported. The fossil remains from two of the outcrops, Can Mas and Hostalets, were studied long time ago, and it seemed suitable to reconsider their corresponding taxonomical identifications.

Key words: Miocene, Neogene, Iberia, Phasianidae, *Miophasianus*, *Palaeoperdix*.

RESUMEN

Este trabajo trata sobre la aparición de dos géneros de Phasianidae en localidades españolas del Mioceno. Los restos fósiles de dos de los yacimientos, Can Mas y Hostalets, fueron estudiados hace mucho tiempo y, en consecuencia, parecía conveniente reconsiderar sus identificaciones taxonómicas.

Palabras clave: Mioceno, Neógeno, Iberia, Phasianidae, *Miophasianus*, *Palaeoperdix*.

Introduction

Some Miocene localities from the Iberian peninsula bearing fossil remains of phasianids have been reported (Villalta & Crusafont, 1950; Villalta, 1963; Sánchez, 1995, 1999). This work deals with the appearence of two phasianids: *Miophasianus altus* and *Palaeoperdix medius* in three localities of the Iberian peninsula: Toril 3A, Hostalets de Piérola and Can Mas.

Toril 3A locality is situated close to the town of Daroca (Zaragoza province). The mammal assemblage was attributed to the biozone MN 7+8 (Bruijn *et al.,* 1992) (fig. 1).

Hostalets de Piérola is located near the homonymous village (Barcelone province), in the Vallés-Penedés basin (fig. 1). This name of the basin has been wrongly taken in some specialized works as to the fossil locality. There are two main outcrops under the classic name of Hostalets, attributed respectively to MN8 and MN9 (Agustí *et al.,* 1984a, 1984b).

Can Mas is near El Papiol village (Barcelone province), also in the Vallés-Penedés basin (fig. 1). Attributed to the biozone MN4 (Agustí *et al.,* 1984a).

Miophasianus altus was described by Milne-Edwards (1869-71) on fossil remains from Sansan (Astaracian, biozone MN 6) as *Phasianus altus*. Lambrecht (1933) erected the new genus of *Miophasianus* for the Miocene species of *Phasianus*. Cheneval (2000) has recently reexamined the fossils from Sansan, transferring *Miophasianus medius* to the genus *Palaeoperdix*. *Miophasianus* is the only known fossil genus of turkeys. Thus, in spite of the two generic names applied to *Miophasianus altus*, the most alike current species, on osteological characters as well as its size, is *Pavo cristatus* (Cheneval, 2000). *Miophasianus altus* as been also identified in some other sites: France: La Grive Saint Alban (Astaracian, MN 7/8) (Déperet, 1887; Lydekker, 1893; Gaillard, 1939; Ballmann, 1969), Germany: Attenfeld (Astaracian, MN 7) (Schlosser, 1916), Dechbetten (MN 5) (Ammon, 1918: as *M. augustus*), Oehningen (Astaracian, MN 7) (Lydekker, 1891), Sandelzhausen (Orleanian, MN 5) (Göhlich, 2002), Steinheim (MN 7) (Heilzmann & Hesse, 1995), Slovakia: Děvinská Nová Ves (or Neudorf) (Astaracian, MN 6) (Švec, 1986), and in some localities of Spain. Moreover,

[1] Museo Nacional de Ciencias Naturales. José Gutiérrez Abascal, 2. 28006 Madrid. IPHES-Institut Català de Paleoecologia Humana i Evolució Social. mcnas539@mncn.csic.es

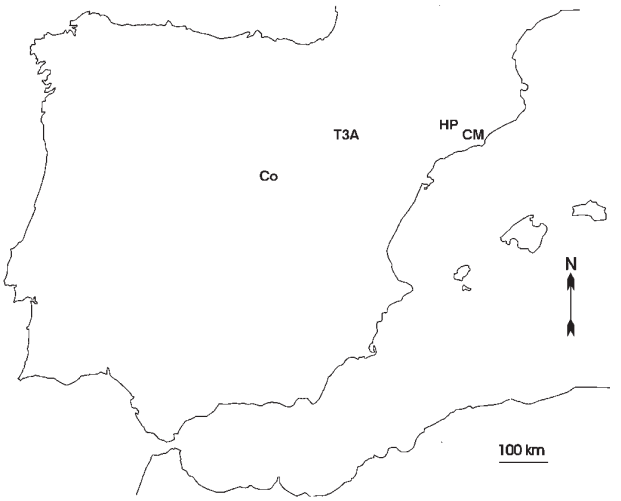

Fig. 1.—Geographical situation of fossil localities in the Iberian Peninsula. Current shorelines. CM – Can Mas, Co – Córcoles, HP – Hostalets de Piérola, T3A – Toril 3A.

Cheneval (2000) mentions that the identification of *Miophasianus sp*. in the French locality of Vieux Collonges (Orleanian, MN 5) by Ballman (1972) could corresponds to *Miophasianus altus*, and the same could be said on the fossil material from the Spanish Córcoles (Orleanian, biozone MN 4) (Alférez *et al.,* 1982) (fig. 1).

Villalta & Crusafont (1950) mentioned four species of galliforms from the locality of Hostalets de Piérola: *Miophasianus altus*, *M. medius*, *Palaeortyx miocaena* and *P. edwardsi*. Later, Villalta (1963) incorporated *Palaeoperdix sansaniensis* to the record of this site. Likewise, Villalta (1963) presented the finding of two galliforms in Can Mas locality: *Miophasianus altus* and *Palaeortyx edwardsi*.

The genus *Palaeoperdix* was originally described in Sansan by Milne-Edwards (1869-71). The description wrongly points to *Perdix* like the recent taxon to which more it looks like, but the systematic limits of *Palaeoperdix*, *Palaeortyx*, *Miophasianus* and *Palaeocryptonyx* have been the subject of some revisions (Brodkorb, 1964; Ballmann, 1969; Cheneval, 2000; Göhlich & Mourer-Chauviré, 2005). Only an overall revision could clarify the systematics of the Miocene phasianids (Cheneval, 2000).

Palaeoperdix sansaniensis Milne-Edwards, 1869-71, was identified by Villalta (1963) on one distal end of tibiotarsus from Hostalets de Piérola. This species was based upon a likewise distal end of tibiotarsus from Sansan. It has a size smaller than *Palaeoperdix prisca* Milne-Edwards, 1869-71. But owing to the fragmentary state of the specimen, Milne-Edwards had some dubts on the generic allocation of this species to the genus *Palaeoperdix* —it was originally spelled as *Palaeoperdix (?) sansaniensis*—. Recently, Cheneval (2000) synonymized *Palaeoperdix sansaniensis* with *Palaeoperdix prisca* and subsequently transferred this species into the genus *Palaeortyx*. As a consequence, for this author only two species remain in the genus: *P. longipes* and *P. medius*.

Besides Hostalets and Sansan, *P. medius* has been recorded in Przeworno II (MN 6/7) (Bocheński, 1987) and La Grive Saint Alban (Déperet, 1887; Ennouchi, 1930; Gaillard, 1939; Ballmann, 1969).

Systematic paleontology

The osteological nomenclature follows Baumel & Witmer (1993). Abbreviations of measures: Gl – greatest length, Pw: proximal width, Pd: proximal depth, Wd: smallest width of the diaphysis, Dw: distal width, Dd: distal depth.

Order Galliformes Temminck, 1820
Family Phasianidae Vigors, 1825
Genus *Miophasianus* Lambrecht, 1933
Miophasianus altus (Milne-Edwards, 1869-71)
Figure 2 (a, b, c)

1869-71 *Phasianus altus*, sp. nova Milne-Edwards, vol. 2, p. 239, pl. 131, fig. 27-36.
p. 1950 *Miophasianus altus* (Milne-Edwards, 1869-71) – Villalta & Crusafont, p. 147, fig. 1.
p. 1963 *Miophasianus altus* (Milne-Edwards, 1869-71) – Villalta, p. 271, pl. 4-5.
1969 *Miophasianus altus* (Milne-Edwards, 1871) – Ballmann, p. 175, pl. 15.
2000 *Miophasianus altus* (Milne-Edwards, 1869-71) – Cheneval, p. 351, fig. 9-11.
p.? 2002 *Miophasianus altus* (Milne-Edwards, 1869) – Göhlich, p. 178, fig. 1-4.

Material from Toril 3A

Complete coracoid (3A-01, D-8), crushed caudally; one distal end of humerus; one diaphysis with its corresponding distal end of humerus, very crushed; complete carpometacarpus which lacks the processus extensorius and the os metacarpale minus; complete femur (3A-99), being its proximal end lightly

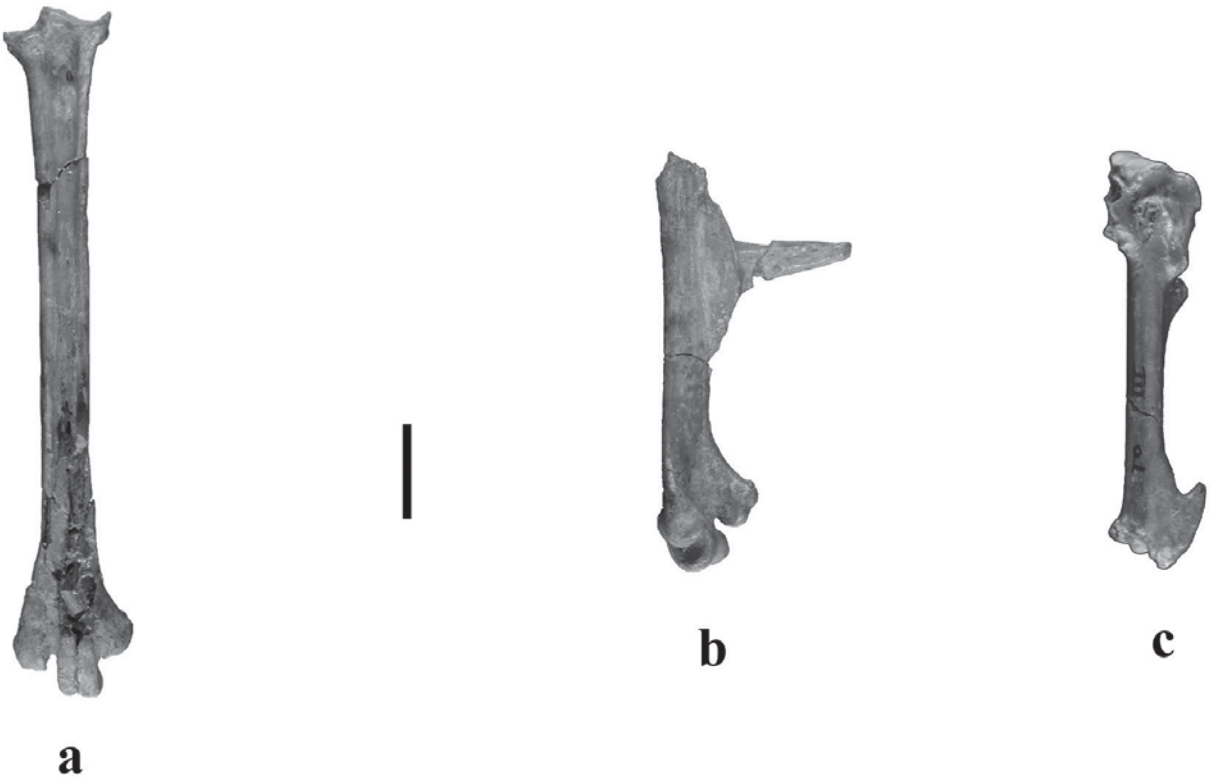

Fig. 2 – *Miophasianus altus* from Toril 3A. a: tarsometatarus, anterior view; b: distal end of tarsometatarus, lateral-inner view; c: carpometacarpus, internal view.

crushed and lacking a part of the lateral condyle; complete tibiotarsus (3A-01, D-23), with both cnemial crests severely damaged; two distal ends of tibiotarsus; one fragment of diaphysis of tibiotarsus; one complete tarsometatarsus; one distal end and a third of the diaphysis (not in connection) of a tarsometatarsus; two distal ends of tarsometatarsus lacking the outer throcleae; one distal half of one tarsometatarsus bearing a spur and one isolated spur.

Material from Hostalets de Piérola

Two distal ends of humerus, housed in the Institut Paleontològic de Sabadell (Villalta & Crusafont, 1950). The fossils have not been seen by the author. Although they were described and figured by Villalta & Crusafont (1950), this is almost useless owing to the low quality of the figures and the little skilfull descriptions. In spite of it, we may be certain that the fossils belong to Galliformes. These authors (Villalta & Crusafont, 1950) attributed three distal ends of humerus to this species, but the size of the smallest specimen seems to accord better with *Palaeoperdix medius*. Their measurements are given in table 1.

Original description of the three humeri: "...[the remains show an] almost identical structure to the corresponding known specimens from La Grive Saint-Alban (Isère), figured by Lydekker (1893) and Gaillard (1939). An elliptical-shaped brachial depression, situated in oblique angle, is observed in the anterior side of the bone; the epicondylus dorsalis, where the extensor muscle attaches, is quite robust in the three specimens, although proportionately less (robust) in the smaller one.The condyle for the ulna is very robust and intensely dominant on the radial condyle, being the latter in the middle of the end of the bone" [literal translation by A.S.M.] (Villalta & Crusafont, 1950: 148).

Material from Can Mas

One proximal and one distal ends of two different ulnae, one proximal end of femur and one distal end of tibiotarsus (Villalta, 1963). As in the case of Hostalets de Piérola, the fossils have not been seen

Table 1.—**Comparisons of measurements (in mm) of *Miophasianus altus* and *Palaeoperdix medius***

	Gl	Pw	Pd	Wd	Dw	Dd
coracoides						
M. altus - Toril 3A	60.5	12.5	7.9	—	—	—
humerus						
M. altus - La Grive	103.2	24,3-26,1 [4]	—	9.9	20.7-21.1 [2]	—
M. altus - Steinheim	100.5	(25.9)-27.0 [2]	—	9.6-10.0 [2]	19.7-21.0 [2]	—
M. altus - Hostalets	—	—	—	—	19.5	—
M. altus - Hostalets	—	—	—	—	19.0	—
*P. medius** - Sandelzhausen	—	(18.0)	—	—	(17.5)	—
P. medius - La Grive	—	17.7	—	—	—	—
P. medius – Przeworno II	—	>15.5-16.4 [2]	—	—	—	—
P. medius - Toril 3A	—	—	—	—	17.2	8.7
P. medius - Hostalets	—	17.4	—	—	—	—
*P. medius*** - Hostalets	—	—	—	—	17.3	—
carpometacarpus						
M. altus - La Grive	—	15	—	—	—	—
M. altus - Toril 3A	45.8	*ca*. 13.0	7.0	4.0	9.5	5.1
femur						
M. altus - Steinheim	101	21	—	—	19	—
M. altus - Dechbetten	100	20	—	—	20	—
M. altus - Sandelzhausen	116	24.0	14.3	9.5	21.7	17.5
M. altus - Toril 3A	87.3	20.0	11.9	8.2	17.4	—
tibiotarsus						
M. altus - Sansan	—	—	—	7.8	>16	15.1
M. altus - La Grive	—	—	—	8.3	13.3-15.8 [2]	12.2-15.8 [3]
M. altus - Steinheim	—	—	—	—	15-16 [3]	15-16 [3]
M. altus - Sandelzhausen	(188)	—	—	8.8	12.9-17.5 [3]	(12.6)-(16.3) [4]
M. altus - Toril 3A	147.5	17.9	16.2	8.7	14.9	15.0
M. altus - Toril 3A	—	—	—	—	11.8	11.6
M. altus - Toril 3A	—	—	—	—	12.8	12.9
M. altus - Can Mas	—	—	—	—	16.0	—
P. medius - La Grive	—	—	—	—	(10)	(10.1)-10.3
P. medius - Przeworno II	—	—	—	—	10.7	(10.5)
tarsometatarsus						
M. altus - Sansan	—	15.3	13.7	—	—	—
M. altus - La Grive	—	15.1-18.5 [7]	15.4-16.5 [3]	7.5 [2]	16.4-18.0 [3]	—

Table 1.—**Comparisons of measurements (in mm) of *Miophasianus altus* and *Palaeoperdix medius*** *(continuación)*

	Gl	Pw	Pd	Wd	Dw	Dd
M. altus - Sandelzhausen	—	—	—	—	17.8	—
M. altus - Toril 3A	—	—	—	—	14.8	10.1
M. altus - Toril 3A	94.7	14.9	14.0	6.7	16.8	*ca.* 10.0
M. altus - Toril 3A	—	—	—	—	*ca.* 16.6	*ca.* 10.2
P. medius - Sansan	—	—	—	—	12.0	—
P. medius - La Grive	—	(10.5)-12.0 [4]	11.2-12.0 [2]	5.2-(5.4) [2]	—	11.3

Data from La Grive (except carpometacarpus), Steinheim, Sandelzhausen, Dechbetten, Wintershof-West and Sansan, after Göhlich (2002); data from Przeworno II, after Bocheński (1987); data from Hostalets and Can Mas, after Villalta & Crusafont (1950); data of carpometacarpus from La Grive, after Depéret (1887). Estimated measurement in ( ); number of specimens in [ ]; * *Miophasianus altus* for Göhlich (2002); ** *Miophasianus altus* for Villalta & Crusafont (1950).

by the author. The descriptions of these remains in the study by Villalta (1963) —like in the one by Villalta & Crusafont (1950)— are too vague to support any specific identification. The bones are quite fragmentary at the sight of the low-quality of the photographs, although they are doubtless attributable to Galliformes. Villalta (1963) gave only one measurement of the distal end of the tibiotarsus (table 1).

Descriptions and comparisons

The caudal edge of the coracoid from Toril 3A is not inclines like in *Phasianus*, but almost horizontal. The facies articularis humeralis is very elongated.

The incisura intercondylaris in the humerus from Toril 3A is very smooth. The attachment for the ligamentum collaterale dorsale is relatively large and elongated. The proximal width (*ca.* 18 mm) of the humerus from Sandelzhausen is much smaller than in *Miophasianus altus* from La Grive and Steinheim. Likewise, it is similar to the corresponding bone of *Palaeoperdix medius* from La Grive. Probably, the humerus from Sandelzhausen —which is crushed and strongly deformed (Göhlich, 2002)— should have to be attributed to *Palaeoperdix medius*. This fossil shows similar size than the smallest remain of humerus from Hostalets as well as the one from Toril 3A, which are also assigned to *P. medius*. The dimensions of two larger humeri from Hostalets match the data from La Grive and Steinheim.

The processi extensorius and pisiformis are missing from the carpometacarpus from Toril 3A. The intermetacarpal tuberosity is small and rounded, and it is close to the symphysis metacarpalis proximalis. It is even smaller than in *Phasianus*. The bone shows a deep fossa situated over the mentioned symphysis metacarpalis proximalis.

The femur from Toril 3A is lesser sized than the other bones. Like in the material from Sandelzhausen, the crista trochanteris continues with the linea intermuscularis cranialis, which ends at the medial condyle, feature not seen in *Phasianus*. The sulcus intercondylaris is broad. The impressio ansae musculi iliofibularis is likewise large as in the bone from Sandelzhausen (Göhlich, 2002). The fossa poplitea is fairly deeper than in *Phasianus*.

Two linea intermuscularis run along the lateral side of the diaphysis from the crista fibularis to the lateral condyle. The pons supratendineus is relatively broader than in *Phasianus*. One of the tibiotarsi from Toril 3A has dimensions Dw: 11.8 mm and Dd: 11.6 mm, very close to the ones of *Palaeoperdix medius*. In general, the specimens from this outcrop reach the smallest measurements among the individuals of the species (table 1).

In spite of being lost a part of the talus, the morphology of the proximal end of the tarsometatarsus is in accordance with the original description by Milne-Edwards (1869-71).

Genus *Palaeoperdix* Milne-Edwards, 1869-71

Palaeoperdix medius (Milne-Edwards, 1869-71)

1869-71 *Phasianus medius*, sp. nova Milne-Edwards, vol. 2, p. 242, pl. 131, fig. 24-26.

p. 1950 *Miophasianus altus* (Milne-Edwards, 1869-71) – Villalta & Crusafont, p. 147, fig. 1.

1950 *Miophasianus medius* (Milne-Edwards, 1869-71) – Villalta & Crusafont, p. 149, fig. 2.
p. 1963 *Miophasianus altus* (Milne-Edwards, 1869-71) – Villalta, p. 271, pl. 4-5.
1963 *Miophasianus medius* (Milne-Edwards, 1869-71) – Villalta, p. 272, pl. 5.
1969 *Miophasianus medius* (Milne-Edwards, 1871) – Ballmann, p. 176, pl. 15.
1987 *Miophasianus medius* (Milne-Edwards, 1869) – Bocheński, p. 71, pl. XVII.
2000 *Palaeoperdix medius* (Milne-Edwards, 1869-71), comb. nov – Cheneval, p. 349, fig. 8.
p.? 2002 *Miophasianus altus* (Milne-Edwards, 1869) – Göhlich, p. 178, fig. 1-4.

Material from Toril 3A

Distal end of humerus slightly compressed.

Material from Hostalets de Piérola

One proximal end of humerus (Villalta & Crusafont, 1950). Probably, it is housed in the Institut Paleontològic de Sabadell. The corresponding description and figure only lead to consider it as Galliformes. Also one distal end of humerus wrongly identified by Villalta & Crusafont (1950) as *Miophasianus altus*. Measurements of both remains are in table 1.

Original description of the proximal end of humerus: "In this specimen, almost identical to the one figured by Gaillard (1939) from La Grive-Saint-Alban, we clairly observe the tricipital depression in the posterior side of the bone,...". "There is observed below the trochanter... a large pneumatic hole. We see also the bicipital surface limited by a small furrow. The pectoral crest is very prominent, maybe more than in the specimen from La Grive, to which we have compared it; (the crest) is slightly curved inwards and develops in the direction of the diaphysis." [literal translation by A.S.M.] (Villalta & Crusafont, 1950: 149).

Descriptions and comparisons

In the humerus of Toril 3, the incisura intercondylaris is fairly developed; both condyles are not at the same level, forming a step. The attachment for the ligamentum collaterale dorsale is relatively small and rounded. The morphology of this bone is in accordance with the emended diagnosis of the genus by Cheneval (2000). The pneumatized condition of the ventral fossa pneumotricipitalis excludes the humerus from Hostalets to be attributed to *Palaeortyx* Milne-edwards, 1869 (see Göhlich & Mourer-Chauviré, 2005). The distal width of the humerus from Hostalets reaches the same value than in La Grive and is slightly larger than it may be inferred from the two measurements from Przeworno II (table 1). The two distal ends of humeri, from Toril 3A and Hostalets, are in accordance with the measurement of the specimen from Sandelzhausen, originally adscribed to *M. altus* (Göhlich, 2004).

The present work shows that the gap of sizes between *Miophasianus altus* and *Palaeoperdix medius* is shorter than previously reported, being the specimens from Toril 3A the smallest ones. The occurrence of *Miophasianus altus* is confirmed in Hostalets de Piérola and Can Mas, and it is reported again in the other Miocene locality of Toril 3A. *Palaeoperdix medius* appears in Hostalets de Piérola and Toril 3A.

ACKNOWLEDGEMENTS

This work has been realized with the economic support of the Diputación General de Aragón (convenios 104/97, 075/98, 116/99, 139/00, 128/01) and the Ministerio de Educación y Ciencia (BTE 2003/03001).

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Recibido el 5 de octubre de 2006
Aceptado el 3 de noviembre de 2006