

A MIOCENE AMPHICYONID (MAMMALIA: CARNIVORA) FROM THE BONE VALLEY FORMATION OF FLORIDA

ANNALISA BERTA¹ and HENRY GALIANO²

¹Department of Zoology, San Diego State University, San Diego, California 92182;

²Department of Vertebrate Paleontology, American Museum of Natural History, New York, New York 10024

ABSTRACT—A mandibular ramus referred to a new amphicyonid species *Pliocyon robustus* is described from the Bone Valley Formation of Florida. This is the first reported occurrence of *Pliocyon* from eastern North America. *Pliocyon robustus* differs from the genotype, *Pliocyon medius*, in a number of characters that include: larger size, deeper and more robust jaw, extremely reduced P₂₋₃, and P₂ larger than P₃. The Florida occurrence of *Pliocyon* indicates the presence of older medial Miocene (either Barstovian or Clarendonian) deposits within the Bone Valley Formation.

INTRODUCTION

The Amphicyonidae comprise a very diverse, yet poorly known extinct group of canoid carnivores. Throughout much of the Tertiary, amphicyonids were widespread in North America, Eurasia, and Africa. The North American record of the genus extends from the Chadronian (early Oligocene) through the Clarendonian (late Miocene), and the largest known samples are from Nebraska, southwestern South Dakota, and eastern Wyoming (Hunt, 1977).

Matthew (1918:190) proposed that "American *Amphicyons*" be united under the genus *Pliocyon*, a broadly defined group which has since been extended to include at least two and possibly three other genera (Tedford, pers. comm. 1982). *Pliocyon* as used here is restricted to the genotype (*P. medius*) and the new species (*P. robustus*) described herein. The type of *Pliocyon medius* (AMNH 17207) is a partial skull of an old individual, as indicated by the extensively worn dentition, collected from the Olcott Formation of Nebraska (Matthew, 1918:190, figs. 2-3; 1924). The exact stratigraphic provenance of this specimen is unknown; however, Skinner et al. (1977:346) suggest that it probably came from East Surface Quarry based on their recovery of a mandible (F:AM 54319) which shows the same degree of preservation and "exactly matches the anomalous wear of the dentition of the type." In addition to this specimen, undescribed samples of lower jaws referred to *P. medius* have been collected from various quarries within the Olcott Formation, lower Snake Creek fauna, Nebraska, and from the Barstow Formation, Green Hills fauna, California. Both of these faunas are early Barstovian in age. This material together with a large collection of amphicyonids housed in the Frick Collection of the American Museum of Natural History was available for study. The purpose of this report is to describe a new amphicyonid species, *Pliocyon robustus* from the Bone Valley Formation of

Florida, and to discuss the significance of this occurrence.

The following institutional abbreviations are used in the text: F:AM, Frick American Mammals, Department of Vertebrate Paleontology, American Museum of Natural History, New York, New York; UF, Vertebrate Paleontology Collection, Florida State Museum, University of Florida, Gainesville, Florida.

SYSTEMATIC PALEONTOLOGY

Order CARNIVORA Bowdich, 1821
Suborder CANIFORMIA Kretzoi, 1945
Superfamily CANOIDEA Simpson, 1931
Family AMPHICYONIDAE Trouessart, 1885
Subfamily AMPHICYONINAE Trouessart, 1885

PLIOCYON ROBUSTUS, new species
(Fig. 1)

Holotype—UF 24013, an incomplete left mandibular ramus with C, P₂₋₃, M₁.

Type Locality—Mr. Frank A. Garcia collected this specimen in 1977 from the Brewster (American Cyanamid Hainesworth) Mine, Polk County, Florida. The jaw was recovered in situ from a green clay lense (about one meter thick) in the Bone Valley Formation, about four meters below the surface. A right M₃, UF 24375 (Fig. 2) referred to *Astrohippus* cf. *martini* (MacFadden, pers. comm. 1982) was collected by Mr. Garcia from the same horizon, approximately three meters from the amphicyonid.

Age and Distribution—Medial Miocene (either Barstovian or Clarendonian) of Florida.

Hypodigm—Type only.

Etymology—Latin, *robustus*, strong. The name refers to the deep, robust jaw diagnostic of this species.

Diagnosis—Differs from other amphicyonid genera in having a relatively short jaw and reduced anterior premolars; larger than *Pliocyon medius*, with deeper,

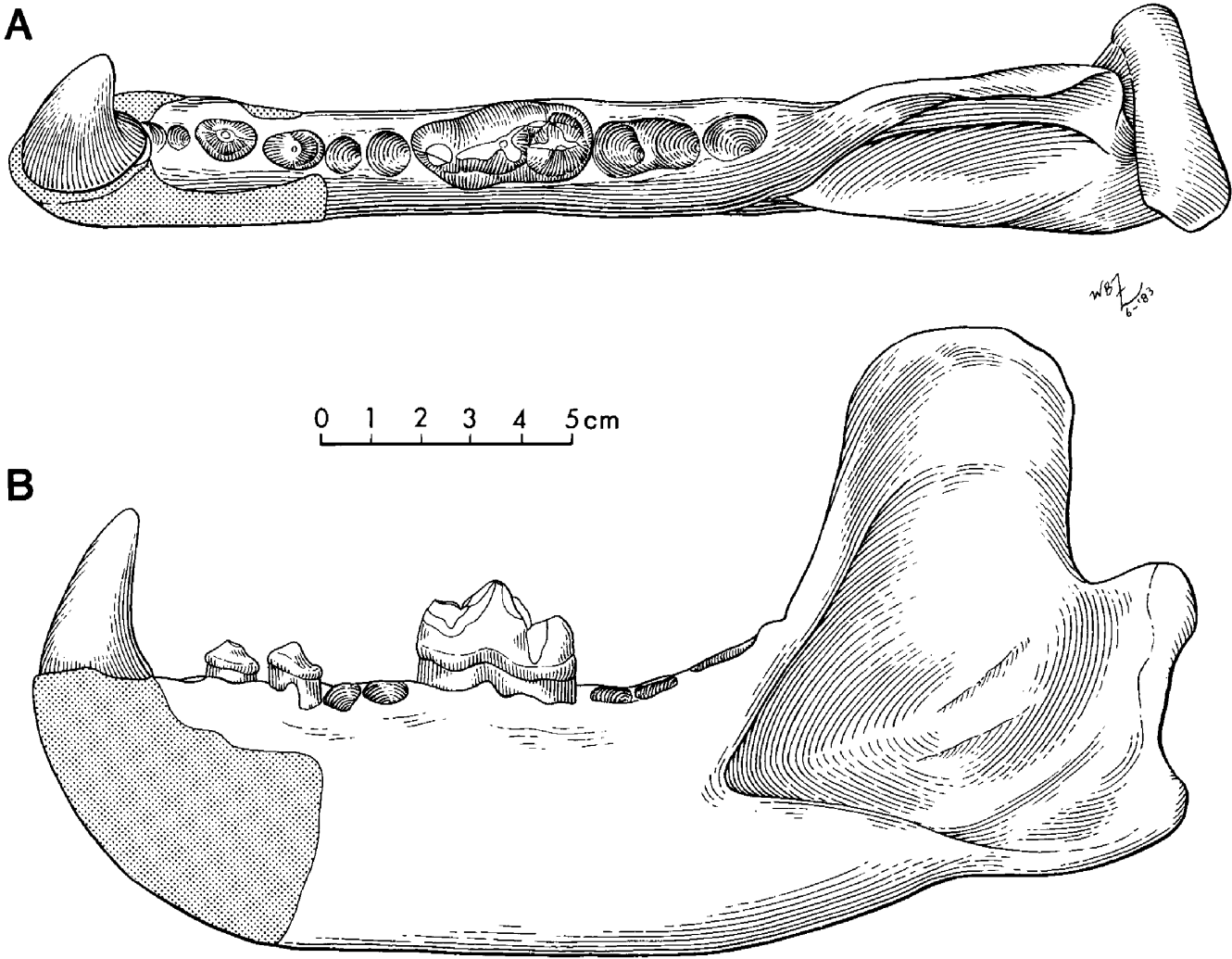


FIGURE 1. *Pliocyon robustus*, UF 24013, left mandibular ramus with C, P₂₋₃, and M₁, from the Bone Valley Formation: occlusal (A) and lateral (B) views.

more robust jaw, extremely reduced P₂₋₃, and P₂ larger than P₃.

Description

The Bone Valley ramus, UF 24013, although crushed, is well preserved. It is larger, more robust, and proportionally deeper below M₁ (Table 1) than in the Olcott or Barstow *Pliocyon medius*. However, in *P. robustus*, as in *P. medius*, the ramus is relatively short in contrast to the long, slender ramus characteristic of many other amphicyonid genera. The shallow masseteric fossa extends to the posterior part of M₂ as in all *P. medius* specimens examined.

The Bone Valley *Pliocyon* was a young adult judging from its slightly worn dentition. The canine is large, robust, and strongly recurved. Two vertical ridges extend from the base of the crown to the apex of the tooth. As apparent from the alveolus, P₁ was single-

rooted, small, and positioned close behind the canine as in *P. medius*. P₂₋₃ are double-rooted, with ovoid occlusal outlines and prominent lingual cingular shelves. They are similar in form and possess a single, low-crowned, anteriorly positioned principal cusp that slopes posteriorly. A ridge extends from the apex of the crown to the broad heel. The tip of the principal cusp in P₂ has been broken away. P₂ is slightly larger than P₃ (Table 1), which differs from the usual size relationship of these teeth among amphicyonids including *P. medius*. Probably owing to their very reduced size, P₂₋₃ in *P. robustus* are not crowded or imbricated as in the Olcott or Barstow *P. medius*. The P₄ alveolus indicates that this tooth was double-rooted and considerably larger than P₂₋₃.

M₁ is relatively larger and more robust in UF 24013, but is otherwise structurally similar to *P. medius*. The paraconid and taller protoconid are separated by a well

TABLE 1. Mandible and dental measurements (in mm) for *Pliocyon robustus* from the Bone Valley Formation, Florida, and *Pliocyon medius* from the Olcott Formation, Nebraska. Abbreviations: a, alveolus only; e, estimated measurement.

	<i>P. robustus</i> UF 24013	<i>P. medius</i> F:AM 54319
Length of ramus (canine-angle)	248.7	—
Length of toothrow (C-M ₃)	154.5	131.2
Length of toothrow (P ₁ -M ₃)	122.7e	108.1
Depth of ramus below M ₁	59.9	42.5
Height of ramus (coronoid-base of ramus)	119.6	94.3
Canine, anteroposterior length	24.4	23.2
Canine, transverse width	15.7	14.3
P ₁ , anteroposterior length	4.9a	6.6
P ₁ , transverse width	3.9a	5.0
P ₂ , anteroposterior length	11.0	11.6
P ₂ , transverse width	7.7	6.5
P ₃ , anteroposterior length	10.7	12.8
P ₃ , transverse width	7.4	6.9
P ₄ , anteroposterior length	19.5a	16.7
P ₄ , transverse width	8.1a	9.5
M ₁ , anteroposterior length	33.2	28.2
M ₁ , transverse width	14.8	14.8
M ₂ , anteroposterior length	21.5a	16.8
M ₁ , transverse width	10.2a	9.6a
M ₃ , anteroposterior length	11.3a	11.0
M ₃ , transverse width	7.0a	6.5

defined notch. The metaconid is situated posteriorly, and is linked to the protoconid by a short crest (Fig. 1). In the Olcott and Barstow *Pliocyon* this cusp is variable in size, and is usually relatively smaller than in *P. robustus*. The broad, rectangular talonid is comprised of a large, crested hypoconid directly behind the protoconid, and a basal cingular ridge is in the position of the entoconid. Judging from the alveolus, M₂₋₃ were elongate, as is characteristic of the Olcott and Barstow *P. medius*.

Discussion

Relationships—The Bone Valley amphicyonid shares with *Pliocyon medius* derived characters that include a shortened jaw and reduced anterior premolars. However, it differs in its larger size, deeper, more robust jaw, extremely reduced P₂₋₃, and P₂ larger than P₃.

Comparison of the Bone Valley ramus with *Pliocyon walkerae* described by Johnston and Christian (1941) from the Clarendonian of Texas does not suggest a close relationship. *P. walkerae* differs in its larger size, deeper, more massive proportions, lack of P₁, larger postcanine diastema, and unreduced anterior premolars. It is more likely that this specimen represents a different taxon, and has been referred to *Ischyrocyon* by Webb (1969).

The distinctiveness of the Bone Valley *Pliocyon* warrants establishment of a new species. Study of amphicyonids currently underway by Robert Hunt will undoubtedly clarify the broader systematic affinities of this animal.

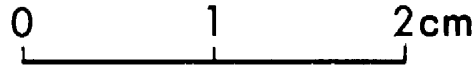
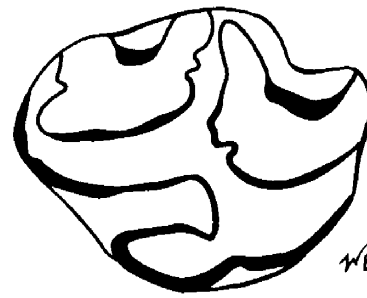


FIGURE 2. *Astrohippus* cf. *martini*, UF 24375, cross-sectioned right M₃ from the Bone Valley Formation.

Biochronology—The Upper Bone Valley Formation in the phosphate mining district of central Florida has traditionally been considered Hemphillian (latest Miocene) in age on the basis of its vertebrate fauna. Pre-Hemphillian faunas are very poorly known from this area (MacFadden and Webb, 1982; Webb and Crisinger, 1983). Prior to this report, the amphicyonid *Pliocyon* was unknown from eastern North America. Previous records indicate a Barstovian to Clarendonian (medial Miocene) range for the genus. The Bone Valley occurrence suggests either the presence of a relictual taxon in Florida or the presence of older, medial Miocene deposits within the Bone Valley Formation. The second interpretation is strengthened by several factors. The equids *Hypohippus chico* (MacFadden, 1982) and *Astrohippus* cf. *martini* are from the same locality within the Bone Valley Formation as *Pliocyon robustus*. The three-toed browsing horse *Hypohippus chico* is restricted to the Barstovian or Clarendonian, whereas the monodactyl species *Astrohippus* cf. *martini* is known only from the Clarendonian (Webb, 1969). Also important is the fact that amphicyonids are unknown in faunas younger than late Clarendonian elsewhere in North America (Tedford, pers. comm., 1982).

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