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NEW YUNNANOSAURID DINOSAUR (DINOSAURIA, PROSAUROPODA) FROM THE MIDDLE JURASSIC ZHANGHE FORMATION OF YUANMOU, YUNNAN PROVINCE OF CHINA

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ABSTRACT

Yunnanosaurus youngi sp. nov. is erected based on the following characters: the distal ends of the sacral ribs expanded anteroposteriorly and dorsoventrally, forming into a sacrocostal yoke, which is contacting with the inner surface of ilium; the ischium is longer than the pubis. *Yunnanosaurus youngi* is about 13 meters long, which is longer than *Yunnanosaurus huangi* (7 meters long). The height exceeding the length for the centra of the posterior dorsal and anterior caudal vertebrae may be a synapopmorphy of Yunnanosauridae and Melanorosauridae. *Yunnanosaurus youngi* is stratigraphically younger than *Y. huangi* and it represents a derived form of yunnanosaurids.

Key words: *Yunnanosaurus youngi,* early Middle Jurassic, Jiangyi, Yunnan Province

INTRODUCTION

The Yunnanosauridae belongs to the Prosauropoda, which has been mostly found from the Upper Triassic to the Lower Jurassic beds (Galton and Upchurch, 2004). The Yunnanosauridae is a monotypic family, and it included only one genus *Yunnanosaurus* (Young, 1942), which is reported from the late Early Jurassic (Young, 1942, 1951; Luo and Wu, 1994, 1995; Dong, 1995). Herein described is a new species of *Yunnanosaurus, Y. youngi* sp. nov., from the early Middle Jurassic Zhanghe Formation of Jiangyi, Chuxiong of Yunnan Province. *Yunnanosaur youngi* is about 13m long, which is longer than the holotype *Yunnanosaurus huangi* (7m, Young, 1942, 1951). *Yunnanosaurus youngi* from the Zhanghe Formation, which is stratigraphically younger than the Fengjiahe Formation, displays some derived characters such as ischium longer than pubis, and rounded distal end of the pubis in outline. Besides *Yunnanosaurus youngi,* sauropod dinosaurs such as *Yuanmousaurus jiangyiensis* (Lü et al., 2006) and a primitive mamenchisaurid (Lü et al., in prep.) and an undescribed ornithopod dinosaur are also discovered from the same area.

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SYSTEMATIC PALEONTOLOGY

Saurischia Seeley, 1887
Sauropodomorpha Huene, 1932
Prosauropoda Huene, 1920
Family Yunnanosauridae Young, 1942
Genus *Yunnanosaurus* Young, 1942

Yunnanosaurus youngi sp. nov.
(Figs. 2–11)

Etymology.— The specific name is in honor of Professor Young C. C., a distinguished paleontologist who was the first to study the dinosaurs from the Lufeng Basin and erected the family Yunnanosauridae in 1942.

Holotype.— A partial complete skeleton without skull, pectoral girdle, forelimb and hindlimb. The specimen is stored in

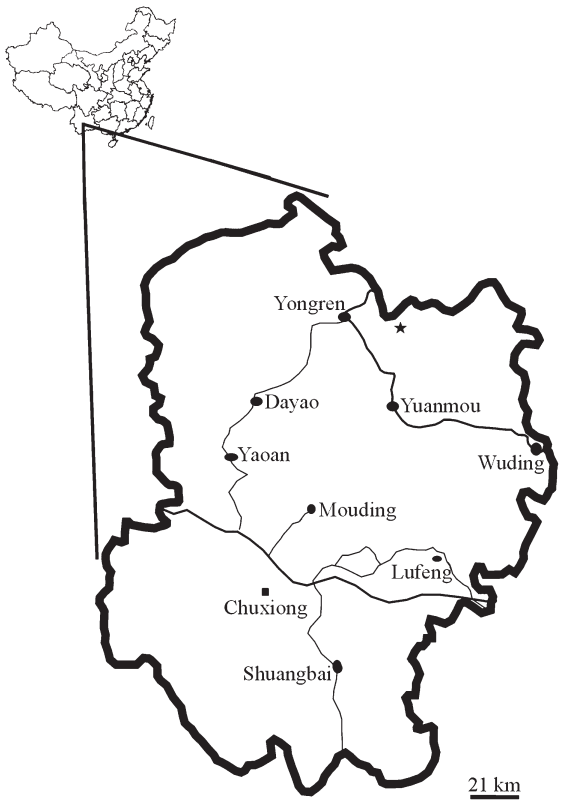

FIGURE 1. Map showing the fossil locality. The star stands for fossil site.

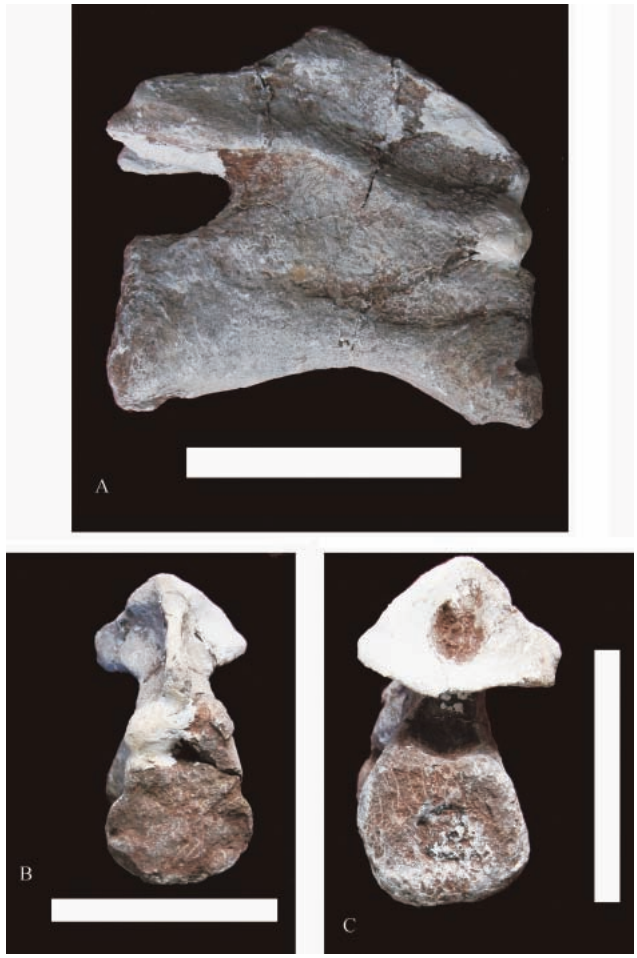

FIGURE 2. The axis of *Yunnanosaurus youngi,* in **A,** right lateral; **B,** anterior; and **C,** posterior views. Scale bar = 10 cm.

the Chuxiong Museum (CXMVZA 185).

Type locality and horizon.— Banqing Houshanliangzi of Jiangyi (Fig. 1), Yuanmou County of Yunnan Province; Zhanghe Formation (Bureau of Geology and Mineral Resources of Yunnan Province, 1990).

Diagnosis.— A new species of yunnanosaurid differs from *Yunnanosaurus huangi* in the following characters: larger size, body length approximate 13 meters long (*Yunnanosaurus huangi* is 7 meters long); the sixth cervical vertebra is the longest among the vertebral column; the neural spines of posterior cervical vertebrae are short with expanded distal end, which is wider than its anteroposterior length; three sacral vertebrae are tightly fused with a stout sacrocostal yoke; the ventral margin of the postacetabular process of the ilium slightly concave; ischium longer than pubis; distal end of the pubis is round.

DESCRIPTION

The skeleton preserved includes almost complete vertebral column (except for some distal caudal vertebrae) and ilium, ischium and pubis. Their measurements are listed in the Tables 1–6. The skull, pectoral girdles, forelimbs and hindlimbs are missing. There are 10 cervical vertebrae, 14 dorsal vertebrae, and 3 sacral vertebrae. The exact number of the caudal vertebrae is not certain due to the lack of posterior caudal vertebrae.

Cervical vertebrae.— Nine cervical vertebrae are well-preserved and naturally articulated from the second cervical vertebra to the tenth cervical vertebra. Among them, the sixth cervical vertebra is the longest. All the cervical vertebrae except for the atlas bear a shallow, elongated lateral concavity, and the neural spines are low and short anteroposteriorly (Figs. 2, 3, 7). Except for the 10th cervical vertebra, the prezygapophyses are elongate and the postzygapophyses are relatively short and stout. The prezygapophysis of the 10th cervical vertebra becomes short, and its facet becomes sub-oval. Except for the axis, all the cervical centra bear the ventral keel. The ventral keels appear near the anterior articular end from the third cervical vertebra to the sixth cervical vertebra. They present along the whole length of the centra from the seventh cervical vertebra to the 10th cervical vertebra. They are very developed in the ninth and tenth

TABLE 1. Measurements of the cervical vertebrae (2-10) of *Yunnanosaurus youngi* sp. nov. (in cm)

Vert.	Lc	Hcp	wca	wcmc	Wcp	ArchH	Wprz	Wprza	Lprza	Wdiap	Wpoz	TotH	Wsp	Hsp
2	13	5	6.4	2.4	65	3.1	4.3	–	–	–	7.8	5.7	1.3	5.9
3	19	6.3	6.9	3.1	8.8	–	7.3	2.4	4.7	–	8.5	–	–	–
4	22	7.5	7.9	3.9	11	–	7.2	2.7	5.5	–	9.4	–	–	–
5	22	9	8.9	5.3	12	–	9.3	3.9	5.6	10.4	10	–	–	–
6	24	10	11	6	13.6	7.5	9.8	3.5	5.8	11.5	11.3	21.7	3	6.9
7	23	12	12	7.2	14.6	–	12	3.8	5.5	12.3	12.5	–	–	–
8	21	15	14	6.9	16.5	9.6	–	–	–	16.6	13.9	32.3	5.3	9.5
9	20	16	17	6.6	17.6	9.7	13.3	5.5	5.5	12.6	13.9	33	7.5	9.9
10	17	16	17	7.4	16.8	10.5	14.8	6.4	6.4	16.8	17.4	–	–	–

Abbreviations: ArchH: height of neural arch (measured from the top of the centrum to the upper margin of the postzygapophysis); Hcp: height of posterior surface of the centrum; Hsp: height of the neural spine (measured from the lower margin of the postzygapophysis to the top of the neural spine); Lc: length of centrum; Lprza: length of the articular surface of the prezygapophysis; TotH: total height of centra; Vert.: position in vertebral column; wca: width of centrum across its anterior surface; wcmc: width cross the middle centrum (narrowest part); Wcp: width of centrum across its posterior surface; Wdiap: width across the diapophysis (maximum distance between the diapophyseal articular surfaces); Wpoz: width across postzygapophysis (i.e., the transverse distance between the lateral margin of the postzygapophyseal articular surfaces); Wprz: transverse width across the prezygapophysis (i.e., the distance between the lateral margins of the right and left prezygapophyses); Wprza: transverse width across the articular surface of the prezygapophysis; Wsp: width across the top of the neural spine; –: un-applicable or not preserved.

TABLE 2. Measurements of the dorsal vertebrae (1-14) of *Yunnanosaurus youngi* sp. nov. (in cm)

Vert.	Lc	Hcp	wca	wcmc	Wcp	ArchH	Wprz	Wprza	Lprza	Wdiap	Wpoz	TotH	Wsp	Hsp
1	15.0	14.3	17.0	4.9	17.4	–	16.4	7.5	5.5	28.0	16.0	–	–	–
2	16.5	13.3	14.3	6.8	14.7	–	11.6	5.0	4.4	23.0	13.0	–	–	–
3	14.6	14.0	16.5	6.6	14.5	–	–	–	–	–	–	–	–	–
4	15.7	13.4	13.3	6.6	12.5	–	12.0	5.0	5.5	20.0	12.0	–	–	–
5	15.5	13.5	13.5	6.6	12.9	–	14.0	6.0	6.0	–	–	–	–	–
6	15.5	13.5	13.5	6.6	13.5	–	14.0	5.5	6.0	27.0	10.0	–	–	–
7	16.0	13.5	13.5	7.1	13.0	–	–	–	–	27.0	–	–	–	–
8	17.0	13.5	13.5	6.8	13.5	8.0	10.0	5.0	6.0	–	11.0	29.5	2.7	9.5
9	16.5	13.5	14.0	7.7	14.0	6.0	10.0	4.0	5.5	–	9.5	31.0	2.4	14.0
10	16.5	13.5	14.0	8.8	14.5	6.5	10.0	5.0	6.0	27.0	9.5	31.0	2.0	11.0
11	16.0	15.5	16.0	9.9	16.0	6.0	10.0	4.5	7.0	28.0	9.0	32.0	2.0	13.0
12	16.0	16.0	17.0	11.4	18.0	6.5	10.0	4.5	6.5	27.0	8.5	–	–	–
13	17.0	17.0	20.0	13.0	21.0	6.5	10.0	4.5	7.0	32.0	9.5	–	–	–
14	16.0	18.0	21.0	14.3	22.0	–	–	–	–	–	–	–	–	–

Abbreviations: ArchH: height of neural arch (measured from the top of the centrum to the upper margin of the postzygapophysis); Hcp: height of posterior surface of the centrum; Hsp: height of the neural spine (measured from the lower margin of the postzygapophysis to the top of the neural spine); Lc: length of centrum; Lprza: length of the articular surface of the prezygapophysis; TotH: total height of centra; Vert: position in vertebral column; wca: width of centrum across its anterior surface; wcmc: width cross the middle centrum (narrowest part); Wcp: width of centrum across its posterior surface; Wdiap: width across the diapophysis (maximum distance between the diapophyseal articular surfaces); Wpoz: width across postzygapophysis (i.e., the transverse distance between the lateral margin of the postzygapophyseal articular surfaces); Wprz: transverse width across the prezygapophysis (i.e., the distance between the lateral margins of the right and left prezygapophyses); Wprza: transverse width across the articular surface of the prezygapophysis; Wsp: width across the top of the neural spine; –: un-applicable or not preserved.

TABLE 3. Measurements of the sacral vertebrae of *Yunnanosaurus youngi* sp. nov. (in cm)

	length	width	height
s1	18.0	21.0	18.0
s2	21.0	8.1(narrowest)	–
s3	21.0	18.5	18.5

TABLE 4. Measurements of the caudal vertebrae (1-16) of *Yunnanosaurus youngi* sp. nov. (in cm)

Vert.	Lc	Hca	wca	wcdr	Hcp	Wcp	ArchL	Wprz	parchL	Wpoz	Hsp	Wsps	Lsps
1	14.4	18.7	18.9	37.5	19.0	15.5	11.0	–	2.5	8.0	–	–	–
2	13.0	19.5	16.5	32.0	18.0	16.0	10.5	11.0	2.0	–	–	–	–
3	13.5	18.0	17.0	26.0	20.0	15.0	10.5	–	2.1	6.5	20.0	3.0	10.0
4	13.5	18.0	15.0	28.0	16.0	14.5	10.0	8.0	3.0	6.6	20.0	2.5	10.1
5	14.0	14.5	15.0	34.0	17.5	14.0	10.0	7.4	3.0	7.0	18.0	2.0	10.0
6	14.5	15.0	14.0	34.0	16.0	14.0	10.0	8.0	2.5	–	18.0	2.0	9.5
7	15.0	14.0	13.5	32.0	15.5	13.5	10.0	–	3.5	6.0	16.0	2.1	7.8
8	16.0	13.0	13.0	26.0	–	–	10.0	7.0	2.5	–	–	–	–
9	15.0	14.0	13.0	–	14.0	12.5	–	–	2.5	–	16.0	1.8	7.8
10	16.0	11.0	12.5	26.5	12.5	12.0	10.0	8.0	2.5	6.0	–	2.1	6.8
11	16.0	11.5	11.5	26.0	12.5	11.5	11.1	6.5	3.0	5.0	12.0	1.9	6.4
12	16.5	11.5	11.5	24.0	12.0	–	–	–	–	–	–	–	–
13	16.5	11.0	11.0	24.0	11.5	10.5	11.0	–	4.0	5.5	11.0	1.0	6.0
14	16.5	10.5	10.5	22.0	11.5	10.5	–	–	–	–	–	–	–
15	16.5	10.5	10.5	19.0	11.5	–	–	–	4.0	4.0	9.5	1.5	5.0
16	16.0	10.0	10.0	–	11.0	10.5	–	–	–	–	–	–	–

Abbreviations: ArchL: anteroposterior length of the base of the neural arch; Hca: height of anterior surface of the centrum; Hca: height of anterior surface of the centrum; Hcp: height of posterior surface of the centrum; Hsp: height of the neural spine (measured from the lower margin of the postzygapophysis to the top of the neural spine); Lc: length of centrum; Lsps: anteroposterior width of the top of the neural spine; Hsp: height of the neural spine(measured from the ventral edge of a postzygapophysis to the top of the neural spine); parchL: post-arch length of centrum (i.e. the distance from the posterior end of neural arch to posterior end of the centrum); Vert.: position in vertebral column; wca: width of centrum across its anterior surface; Wcp: width of centrum across its posterior surface; wcdr: width between the tips of caudal ribs; Wpoz: width across postzygapophysis (i.e., the transverse distance between the lateral margin of the postzygapophyseal articular surfaces); Wprz: width across the prezygapophysis (i.e., the distance between the lateral margins of the right and left prezygapophyses); Wsps: width across the top of the neural spine (measured along the posterior surface); –: un-applicable or not preserved.

TABLE 5. Measurements of the haemal arches of *Yunnanosaurus youngi* sp. nov. (1-16) (in cm)

Haemal arch	L	Wprx	Lprx	Hhc	Wblade	Lblade	Wdist	Ldist
1	35	11	4	12	4	2.5	1.5	2
2	45	11	5	–	–	–	1.5	8
3	55	13	4	15	4.5	4.5	4	5
4	48(pr)	13	4.5	17	4	4	–	–
5	51	12	4.3	15	4.5	4	4	6.5
6	48	11	3.5	15	4.5	4	3.5	6
7	–	–	–	–	–	–	3.5	6
8	40	11	4	14	4	3.5	3.5	6
9	38	11	4.5	–	–	–	3.5	6
10	37	11	4	–	–	–	3.5	6.5
11	36	9.5	4.5	–	–	–	3.5	3.5
12	350	90	50	–	–	–	30	70
13	310	90	40	–	–	–	25	65
14	–	90	35	–	–	–	–	–
15	260	90	35	–	–	–	25	60
16	275	80	35	–	–	–	25	45

Notes: Hhc: height of haemal canal; L: length; Lblade: length of blade; Ldist: length of distal end; pr-preserved; Wblade: width of blade; Wdist: width of distal end; Wprx: width of proximal end; –: un-applicable or not preserved.

TABLE 6. Measurements of pelvic girdle of *Yunnanosaurus youngi* sp. nov. (in cm)

element		dimension
Ilium	length (between tips of the anterior and posterior lobes)	63
	Length of the posterior lobe	31
	Length of pubic peduncle	29
	Transverse width of the distal end of the pubic peduncle	15.5
	Maximum anteroposterior width of the distal end of the pubic peduncle	14
	Transverse width of the dorsal margin of the acetabulum	11
	Transverse width of ischiac peduncle	14
	Diameter of acetabulum between the pubic and ischiac peduncles	31
Pubis	Length (from distal end to the point where the iliac articulation meets the acetabular margin)	63
	Length of iliac articulation along its lateral edge	20
	Maximum transverse width of the acetabular surface	14
	Doroventral length of ischiac articulation	20
	Maximum transverse width of the ischiac articulation	6
	Maximum diameter of obturator foramen	3
	Anteroposterior diameter of distal end	19
	Maximum transverse width of distal end	20
	Maximum width of pubic shaft immediately below the pelvic basin	18
Ischium	Length (from distal end to the point where the acetabular margin meets the pubic articulation)	77
	Length of the pubic articulation	19
	Transverse width of the pubic articulation at its dorsal end	3
	Width of proximal end (from iliac articulation to the ventral end of the pubic articulation)	40
	Minimum dorsoventral width of the distal shaft (at approximately mid-length of the shaft)	6.7
	Dorsoventral width of the distal end	10
	Maximum transverse width of distal end	25
	Transverse width of iliac articulation	13.5

cervical vertebrae and the first dorsal vertebra. All the ventral keels are thin plate-like, extending ventrally, and even outrun the ventral margin of the both articular ends. The middle parts of the centra are constricted. The diapophyses and parapophyses are located at the anterior end of the centrum and they are closely located to each other in the anterior six cervical vertebrae (from the second cervical vertebra to the seventh cervical vertebra). From the 8th cervical vertebra, the diapophyses shift upwards and extend laterally from the neural arches. The lateral concavities become short, deep, and suboval from the 8th cervical vertebra to the seventh dorsal vertebra. The transverse process of the 10th cervical vertebra is plate-like, with flat dorsal and ventral surfaces. The parapophysis is located near the anterior articular end.

The atlas is not preserved. The intercentrum is fused with the axis (Fig. 2). The posterior end of the axis centrum is concave and slightly wider than its anterior end. Both the dorsal and ventral margins of the posterior end are nearly straight, thus displaying a rectangular outline. The prezygapophysis of the axis is not developed, and it is located on the anterolateral surface of the neural arch. The postozygapophysis is strongly developed, and its posterior margin overhangs the axial centrum. A distinct epipophysis is present on the dorsal surface of the postzygapophysis. It joins to the postzygapophysis along its entire length, but it does not exceed the posterior margin of the postzygapophysis. The articular surface of the postzygapophysis faces ventrally and slightly laterally. The neural spine is plate-like and arch-shaped in lateral view. The length of the centrum is less than three times the height of the centrum.

The third cervical vertebra: The third cervical vertebra is almost complete except for its neural spine. The prezygapophysis is elongate and exceeds the anterior articular end of the centrum. Both the anterior and posterior ends of the centrum are concave. The parapophysis is located near the anterior articular end. A weak elongate lateral concavity is on the middle of the centrum. The epipophysis is more distinct than the second cervical vertebra. The articular surface of the postzygapophysis is concave. The posterior margin of the postzygapophysis slightly exceeds the posterior margin of the posterior articular end. A weak keel is present on the ventral

surface near the anterior articular end. In dorsal view, a deep concavity is seen between the postzygapophyses.

The fourth cervical vertebra: Its anterior articular end is flat, while its posterior articular end is strongly concave. The posterior articular end is wider than its anterior end. A ventral keel is distinct at the ventral surface near the anterior articular end. The right lateral concavity is deeper than the left one. The lateral concavity bears a weak dorsal margin. The centrum is curved in lateral view. A longitudinal ridge extends posteriorly near the base of the prezygapophysis at the middle portion, and disappears at the vertical level of the lateral cocavity. The cross-section of the preszygapophysis is triangular. The articular surface of the postozygapophysis is round and faces ventrally.

The fifth cervical vertebra: It is similar to the fourth cervical vertebra. The anterior articular end is flat and its posterior articular end is strongly concave. The lateral concavity is deep with distinct dorsal margin. The diapophysis and parapophysis are distinct and closely located. The epipophysis is stout and separated by a shallow groove from the postzygapophysis. The lateral concavity is located at the middle portion of the centrum.

The sixth cervical vertebra: This vertebra is almost complete except for small portion of the postzygapophysis. The anterior articular end is flat and its posterior articular end is strongly concave. The ventral keel and groove is more developed than those of the anterior ones. It disappears near the middle of the centrum. The diapophysis and parapophysis are closely located one above the other. The neural spine is short and rectangular in lateral view. The dorsal surface of the neural spine is round. The anterior margin of the neural spine is straight. There is a tuberosity on the lateral surface of the neural spine near the anterior end.

The seventh cervical vertebra: The anterior articular end is flat and rounded. The ventral keel is present on the whole ventral surface. The anterior part of the keel is deeper than its posterior part. The postzygapophyses are wider than those of anterior ones. The articular surface of the postzygapophysis is oval and concave. The epipophysis is weak. The parapophysis is located near the anterior articular end, and the diapophysis is shifted posterodorsally. The lateral concavity is becoming short and deeper than the anterior ones.

The eighth cervical vertebra: The posterior end is much wider than its anterior end. The anterior end is slightly concave and its posterior end is strongly concave. The ventral keel is also developed. The parapophyseal surface is oval and the diapophysis is fused with the cervical rib. The lateral concavity becomes larger and higher. The base of the neural arch shifts posteriorly. The neural spine is short with expanded distal end. A tuberosity is present on the lateral surface of the neural spine. The height is nearly equal to its length. Both the anterior and posterior surfaces of neural spine are concave. The epipophysis is tuberous and does not overhang the posterior margin of the postzygapophysis.

The ninth cervical vertebra: The ventral keel is thin plate-like and strongly developed. The transverse process is plate-like, extends ventrally, and slightly laterally. The prezygapophysis is short and stout with the facets facing dorsomedially. The neural spine is narrower than the anterior one. Both the anterior and posterior articular surfaces are concave. A distinct postzygodiapophyseal lamina is weakly developed. It forms a shallow concavity with the base of the postzygapophysis.

The tenth cervical vertebra: The distal end of the prezygapophysis is wider than anterior ones. The articular surface is oval. The ventral surface of the prezygapophysis is concave and its lateral margin continues to the diapophysis, thus a deep concavity is formed by the lateral margin of the prezygapophysis and lateral margin of the neural canal. The anterior articular end is round. The lateral concavity is well developed. The posterior end is heart in shape. The transverse process extends ventrolaterally. The ventral surface of the postzygapophysis is slightly concave. The postzygadiapophyseal lamina is weakly developed. A deep concavity is present on the ventral surface of the base of the postzygapophysis.

Dorsal vertebrae.— There are 14 dorsal vertebrae that are naturally articulated. Almost all the dorsal vertebrae are well-preserved, except for missing parts of their neural arches.

The dorsal vertebral series display the following changes:

(1) Ventral keel: Ventral keels are present only in the first three dorsal vertebrae (the first dorsal to the third dorsal vertebrae). A deep ventral groove appears on the last dorsal vertebra.

(2) The position of parapophyses (Fig. 3): They shift from the lateral concavity (in the first dorsal vertebra) to the position striding the neural-central suture (from the second to the fourth dorsal vertebrae), then to the neural arch (from the fifth to the twelfth dorsal vertebra) (on lateral surface of the base of the prezygapophyses) and finally, they are fused with the diapophyses and the dorsal ribs in the thirteenth and fourteenth dorsal vertebrae.

(3) The shape of the neural spines (Figs. 3, 7): The neural spines are short with expanded distal ends in the first four dorsal vertebrae (the first dorsal vertebra to the fourth dorsal vertebra). The neural spine becomes plate-like and elongated anteroposteriorly from the fifth to the fourteenth dorsal vertebrae.

(4) Lateral concavities (Fig. 3): The first six dorsal vertebrae (from the dorsal vertebra to the sixth dorsal vertebra) bear lateral concavities, whilst the lateral concavities disappear from the seventh to the last dorsal vertebrae.

The anterior articular ends of the first, third, eighth, thirteenth and fourteenth dorsal vertebrae are flat, others are moderately concave. The posterior articular end of the last dorsal (the fourteenth dorsal vertebra) is strongly concave.

The first dorsal vertebra: The diapophysis is quite different from those of the anterior ones, thus, this vertebra is inferred to the first dorsal vertebra. The anterior articular end is flat and its posterior articular end is concave. The anterior articular end is heart in shape, while its posterior articular end is oval, this may

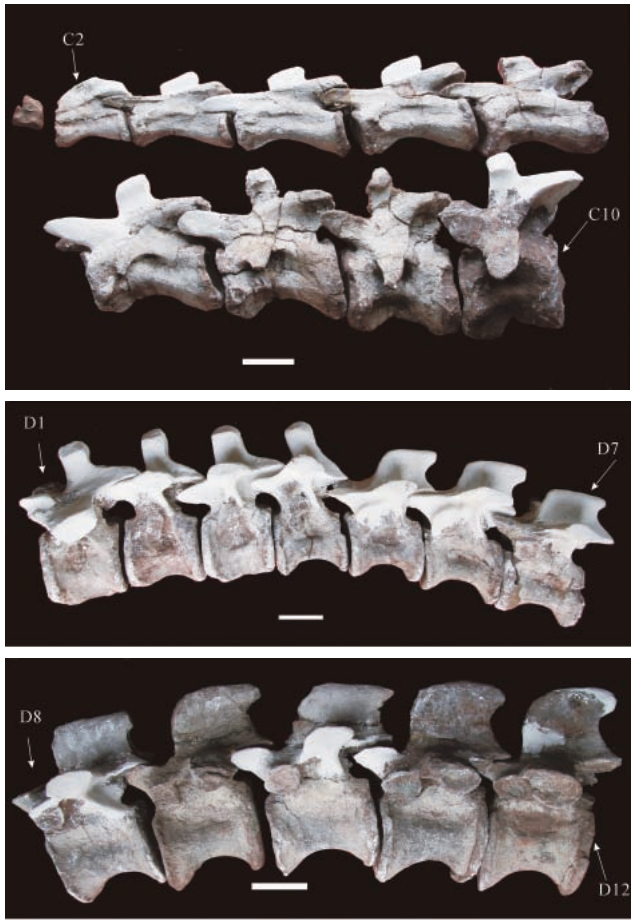

FIGURE 3. **C2–C10**, Left lateral view of cervical vertebrae; and **D1–D 12**, dorsal vertebrae of *Yunnanosaurus youngi* sp. nov. The missing portion is restored with plasters (white). Scale bar = 10 cm.

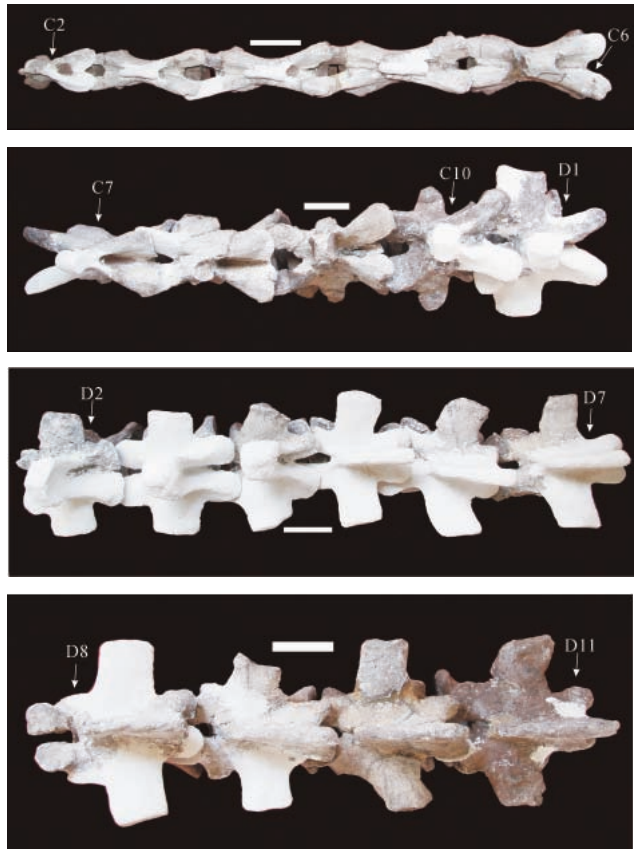

FIGURE 7. **C2–C10,** The dorsal views of cervical vertebrae; and **D1–D 11**, dorsal vertebrae of *Yunnanosaurus youngi* sp. nov. The missing portion is restored with plasters (white). Scale bar = 10 cm.

be caused by the preservation. The prezygapophysis is short and stout. The articular facet of the prezygapophysis is oval and slightly convex. The diapophysis is developed, with triangular articular surface. The anterior margin of the diapophysis connects with the lateral margin of the prezygapophysis. The posterior margin connects with the lateral margin of the postzygapophysis. Distinct laminae bound a triangular infradiapophyseal fossa on the neural arch. The parapophysis is located at the middle of the centrum. The ventral keel is strongly developed, extending ventrally, and exceeding the lower margin of the centrum. A deep concavity is present near the base of the postozygapophysis. The neural spine is not preserved. The facet of the postzygapophysis becomes smaller than the anterior ones. The epipophysis is small, and it does not overhang the posterior margin of the postzygapophysis.

The second dorsal vertebra: Both the anterior and posterior articular ends are heart in shape and concave. The neural spine and the left prezygapophysis, postzygapophysis and diapophysis are missing. It is very similar to the first dorsal vertebra, except for the following differences: The parapophysis is suboval, with about 32 mm in diameter; the diapophysis is located at the middle of the neural-centrum suture which is above the lateral concavity; the middle of the ventral keel is higher than both ends and the anterior articular end is concave.

The third dorsal vertebra: The neural arch of the third dorsal vertebra is missing. The anterior articular end is flat. The parapophysis is located below the infradiapophyseal fossa. The ventral keel is almost at the same level of the ventral margin of the centrum.

The fourth dorsal vertebra: The neural arch is not completely preserved. Both the anterior and posterior articular ends are concave. The ventral margin of the centrum is smooth without ventral keel. The parapophysis shifts to near the anterior articular end of the centrum, and strides the neural-central suture. The neural canal is large. The diapophysis extends posterolaterally. The lateral concavity becomes smaller and deeper than the anterior ones.

The fifth dorsal vertebra: The centrum and the right prezygapophysis are well-preserved, but the other part is missing. The facet of the prezygapophysis is oval, and faces

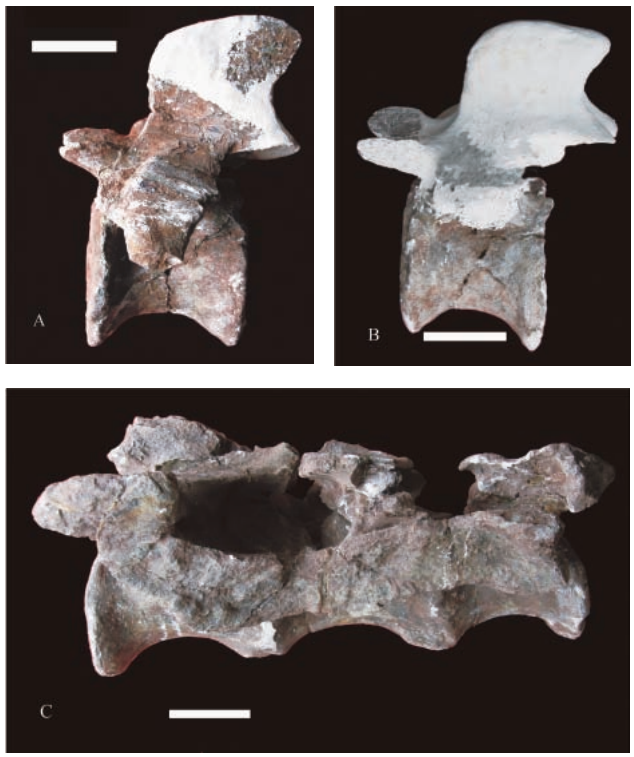

FIGURE 4. **A,** The thirteenth dorsal vertebra; **B,** the fourteenth dorsal vertebra; **C,** and the sacral vertebrae of *Yunnanosaurus youngi* sp. nov. in left lateral views. The missing portion is restored with plasters (white). Scale bar = 10 cm.

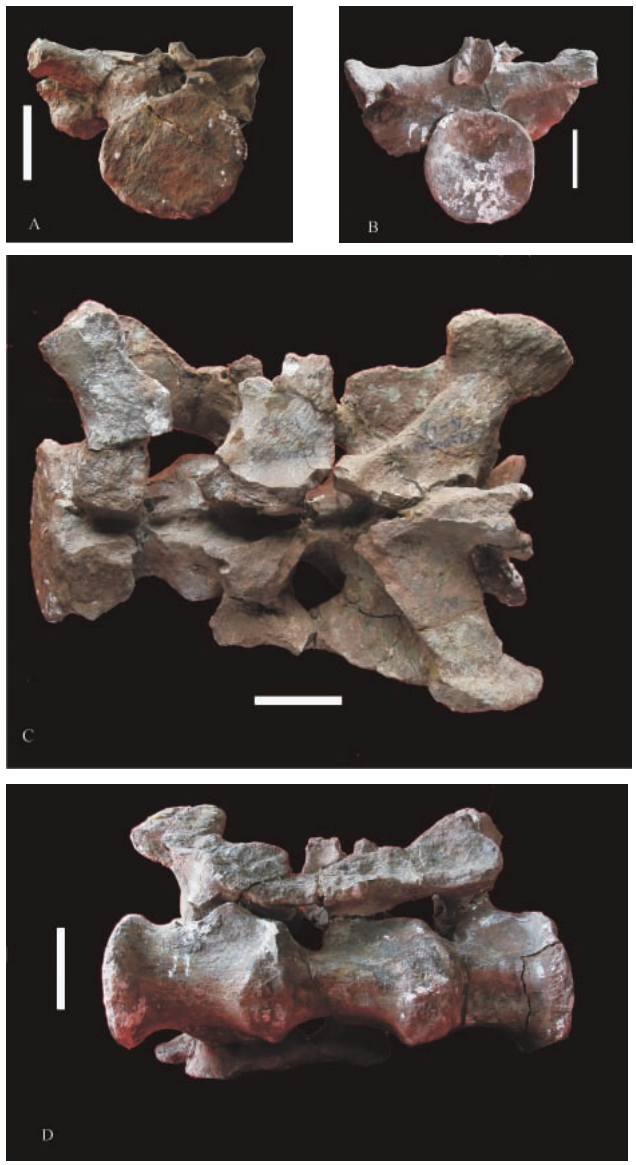

FIGURE 5. **A**, The anterior view of the first sacral vertebra; **B,** the posterior view of the third sacral vertebra; **C**, the dorsal view; and **D,** ventral view of the sacrum of *Yunnanosaurus youngi* sp. nov. The missing portion is restored with plasters (white). Scale bar = 10 cm.

dorsally. The anterior margin of the prezygapophysis slightly overhangs the anterior margin of the anterior end. The parapophysis becomes larger than that of the fourth dorsal vertebra, and it is oval with long axis (7cm). It is located at the lateral surface of the base of the prezygapophysis. The parapophysis completely shifts from the centrum to the neural arch. The lower margin of the parapophysis is at the level of the dorsal margin of the centrum. The broken surface shows that the base of the neural spine becomes much longer anteroposteriorly than those in the anterior dorsal vertebrae.

The sixth dorsal vertebra: This vertebra is almost complete except for the neural spine and left side of the neural arch. The parapophysis shifts higher than that of the fifth dorsal vertebra. There are two laminae from the transverse process, which connect the prezygapophysis and the diapophysis respectively.

The seventh dorsal vertebra: The dorsal margin of the parapophysis is close to the dorsal margin of the prezygapophysis near the base, thus the lamina connects with the prezygapophysis, and the transverse process (pre-diapophysis) almost disappears, and leaving a trace of it near the anterior margin of the base of the transverse process. Other characters are similar to those of the sixth dorsal vertebra.

The eighth and ninth dorsal vertebrae: The anterior articular end is slightly concave, while its posterior articular end is nearly flat. The ventral surface is rounded. The lateral concavity is shallow. The parapophysis is rounded with concave surface. The lamina connecting the prezygapophysis and the transverse process is completely disappeared. The facet of the postzygapophysis is large, and faces ventrally and slightly laterally. The neural spine is plate-like and rectangular in lateral view. Its anterior margin is straight, while its posterior margin is concave with a projecting posterodorsal corner. A deep groove is present between the laminae, which connects with the postzygapophysis.

The tenth dorsal vertebra: The anterior articular end is slightly concave, while its posterior articular end is nearly flat. The lateral concavity becomes shallow. The infradiapophyseal fossa becomes distinct. The parapophysis is located lateral to the base of the prezygapophysis. A deep concavity is present on the anterior surface of the base of the transverse process. The transverse process almost horizontally directed. A hyposphene is present, but low, and it is less than the height of the neural canal. The anterior margin of the infradiapophyseal fossa is formed by the high placement of the parapophysis. The neural canal is subcircular. The shape of the spinopostzygapophyseal lamina is singular. The distal end of the neural spine is not expanded transversely. Its anteroposterior length is 135mm.

The eleventh dorsal vertebra: Both the anterior and posterior articular ends are moderately concave. The parapophysis is oval, and its posterior margin forms the anterior margin of the infradiapophyseal fossa. The transverse process is oriented horizontally, and its distal end is suboval. The anteroventral margin of the transverse process continues to contact with the parapophysis, and its posterodorsal margin contact with the postzygapophysis. The centrodiapophyseal lamina is stout, forming the posterior margin of the large infradiapophyseal fossa.

The twelfth dorsal vertebra: The ventral surface of this centrum is rounded and there is no lateral concavity. The diapophysis and parapophysis are close to each other, indicating that the short distance between the rib head and the rib tuberosity.

The thirteenth dorsal vertebra (Fig. 4A): Part of the neural arch is missing. The anterior articular end is slightly concave, while its posterior articular end is moderately concave. Both ends are oval, and there is no lateral concavity. The dorsal rib is fused with the transverse process and the parapophysis. The distal end of the dorsal rib extends ventrally, and becomes pointed. The infradiapophyseal fossa becomes narrow and deep.

The fourteenth dorsal vertebra (Fig. 4B): The cenrum is well-preserved, but most of the neural arch is missing. The anterior articular end is flat, and its posterior end is strongly concave. A strongly developed groove appears on the ventral surface of the centrum, and this groove is similar to that of the first sacral vertebra.

Sacral vertebrae (Figs. 4C, 5).— There are three sacral vertebrae, which are fused. The anterior articular end of the first sacral vertebra is smooth, indicating that there are no dorsosacral vertebrae. All the neural spines are missing. The anterior end of the first sacral vertebra is flat and oval. There is no lateral concavity. A wide and shallow ventral groove is present on the first sacral vertebra. This groove becomes weaker in the second sacral vertebra and disappears in the third. The first sacral rib is much narrower than the transverse process. The shape of the iliac articular facets for the first sacral rib is singular. The posterior and anterior expansions of the transverse processes of the first and second sacral ribs partly roof the intercostals space. The transverse process of the third sacral vertebra extends posterolaterally, while the transverse process of the second sacral vertebra extends laterally. The dorsal part of the posterior articular end of the third sacral vertebra is strongly concave. The transverse process of the third sacral vertebra is completely fused with the sacral rib of the third sacral vertebra. The distal ends of the sarcral ribs expanded anteroposteriorly and dorsoventrally, forming into a sacrocostal yoke, which contacts with the inner surface of ilium. This implies that these three sacral vertebrae attaching to the pelvic girdle are true sacral vertebrae (Wilson and Sereno, 1998). The smooth posterior articular surface of the third sacral vertebra indicates that there is no caudosacral vertebra.

Caudal vertebrae (Figs. 6, 8).— There are seventeen caudal vertebrae preserved (from the first to the seventeenth caudal vertebrae). They are naturally articulated. Almost all the caudal vertebrae are well-preserved, except for some parts during the process of excavation, and the seventeenth caudal vertebra is partially preserved. The anterior seven caudal vertebrae (from the first to seventh caudal vertebra) are larger than posterior ones. From the eighth caudal vertebra, the centrum becomes smaller, and relatively elongate. The prezygadiapophyseal lamina is present in the anterior 14 caudal vertebrae (from the first to fourteenth caudal vertebra).

From the first to the sixth caudal vertebrae, the height of the centrum exceeds their length (Table 4), and from the seventh caudal vertebra, the condition is reverse. This condition is identical to that of *Yunnanosaurus huangi* (Young, 1942).

The first caudal vertebra: The anterior articular end is strongly concave, and the upper part of the anterior articular end slants anterodorsally, which corresponds to the concave portion of the posterior articular end of the last sacral vertebra. Its posterior articular end is convex. The ventral surface of the centrum is round with slightly concave near the posterior end. The neural spine is widely plate-like, only missing at its upper part. The length of the base of the spine is greater than the half length of the neural arch. The facet of the postzygapophysis is suboval, and faces ventrolaterally. In dorsal view, the postzygapophysis protruding with an interpostzygapophyseal notch is visible. There is no hyposphenal ridge on it. The transverse process is plate-like, and it extends slightly and postolaterally. The base of the transverse process is stout, and deeply extends from the centrum to the neural arch. The posterior margin of the neural spine slopes posterodorsally. The neural canal is oval.

The second caudal vertebra: It is similar to the first caudal vertebra. The upper part of the neural spine is missing. The transverse process is shorter than that of the first caudal vertebra. The anterior articular end is strongly concave and its posterior articular end is flat. The ventral surface of the centrum bears a shallow groove. There is a distinct articular surface for the haemal arch on the ventral margin of the posterior articular end, indicating that the first haemal arch occurs between the second and the third caudal vertebrae.

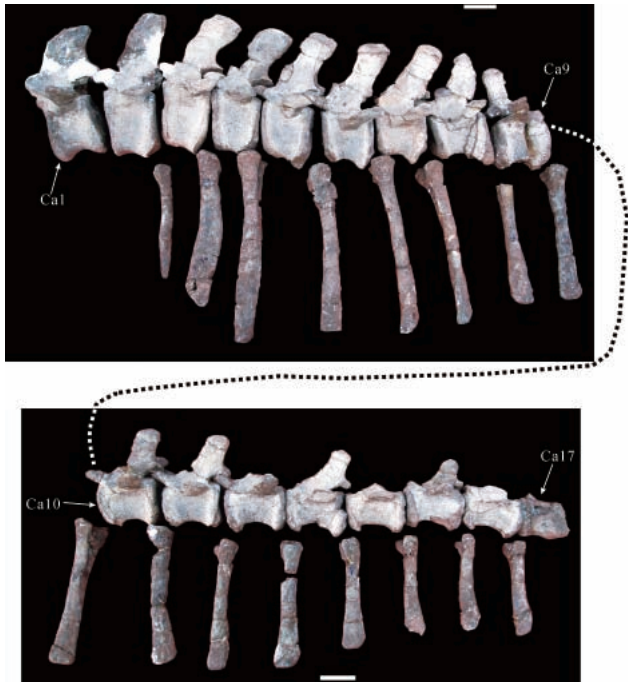

FIGURE 6. The left lateral view of caudal vertebrae of *Yunnanosaurus youngi* sp. nov. The missing portion is restored with plasters (white). Scale bar = 10 cm.

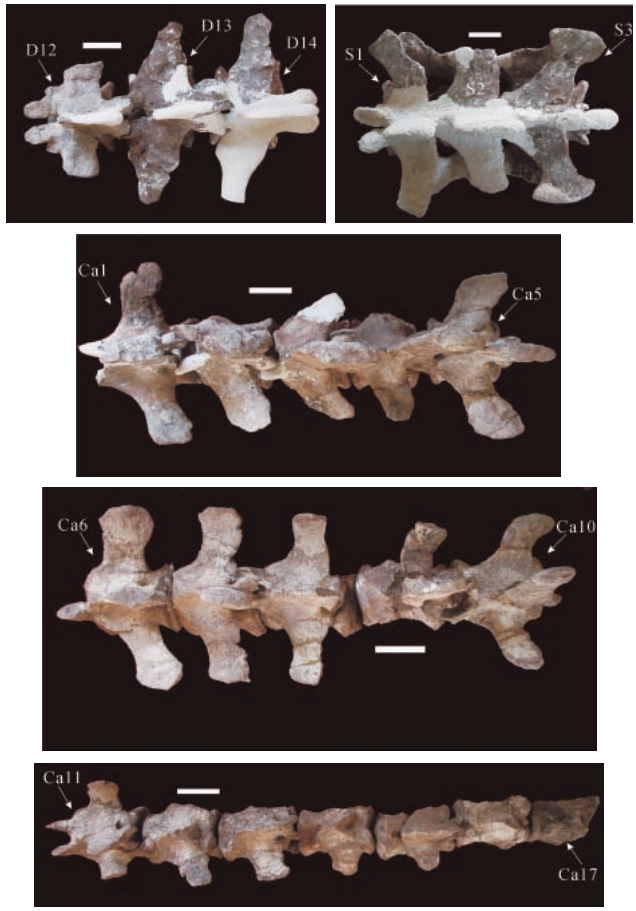

FIGURE 8. **D12–D14**, The dorsal view of dorsal vertebrae; **S1–S3,** sacrum; and **Ca1–Ca17,** caudal vertebrae of *Yunnanosaurus youngi* sp. nov. The missing portion is restored with plasters (white). Scale bar = 10 cm.

The third caudal vertebra: The anterior articular end is concave, and its posterior articular end is flat. A shallow groove appears on the ventral surface of the centrum. The anterior articular end is sub-oval, and its posterior end is elongated dorsoventrally. There is no lateral concavity. The neural spine slightly slants posterodorsally. The distal end is expanded transversely.

The fourth and the fifth caudal vertebrae: They are similar to the third caudal vertebra except for a little difference in size. The facets for the haemal arch near the posterior articular end are larger than the one near the anterior end.

From the sixth to the eighth caudal vertebrae: These three vertebrae are almost identical. Both articular ends of these centra are slightly concave, and their ventral grooves are deep; all these are different from the anterior ones.

From the ninth to eleventh caudal vertebrae: These three caudal vertebrae are almost same in size and shape. Both the anterior and posterior ends are nearly flat. A deep groove is present on the ventral surface of the centrum. The groove becomes deeper posteriorly.

From the twelfth to the sixteenth caudal vertebrae: The ventral groove only presents near the posterior articular end of the centrum. The anterior articular end is flat and its posterior articular end is concave. The prezygapophysis faces medially, and slightly dorsally. The anterior articular surface for the haemal arch is larger than the posterior one. The cross-sectional shape of these vertebrae is oval with rounded lateral and ventral sides. The prezygapophysis is short and slightly overlaps the preceding centrum.

Haemal arches (Fig. 6; Table 5).— The first haemal arch is slender and short. Its shaft is rod-like. As mentioned above, the haemal arch starts from the second caudal vertebra, similar to that of *Yunnanosaurus huangi* (Young, 1942), but differs from that of *Lufengosaurus huenei,* where the first haemal arch begins from the first caudal vertebra (Young, 1941a, 1947). The shaft of the second haemal arch becomes widened anteroposteriorly. The third haemal arch is the longest one, with the mid-shaft slightly expanded anteroposteriorly. The haemal canal is elongate, and the proximal end of the haemal canal is closed. The length of the haemal arches become much shortened from the twelfth caudal vertebra which it connected. The articular ends of the haemal arches are larger and concave. The long haemal arch and suddenly changed size of the caudal vertebrae indicate that this animal bears short and stout tail.

Pelvic girdle.— Both pubes, ischia and a right ilium are

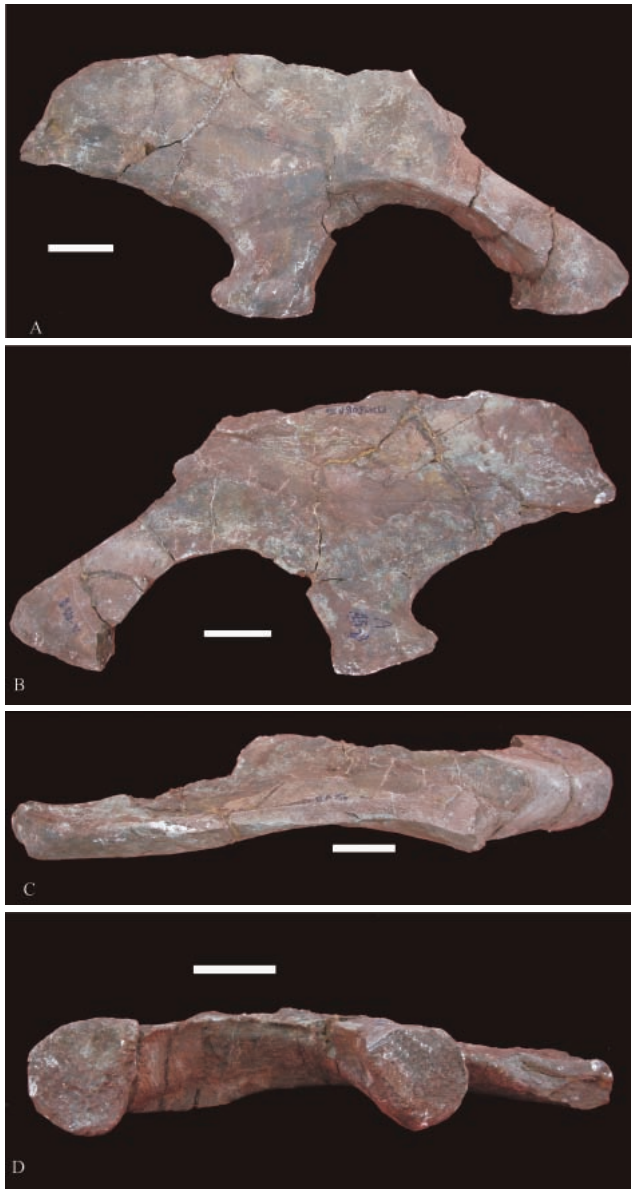

FIGURE 9. The right ilium of *Yunnanosaurus youngi* sp. nov. in **A,** lateral; **B**, medial; **C**, dorsal; and **D,** ventral views. Scale bar = 10 cm.

FIGURE 10. Left pubis of *Yunnanosaurus youngi* sp. nov. in **A,** lateral; **B,** medial; **C**, posterior; and **D,** distal end views. Scale bar = 10 cm.

preserved. The left ilium is partially preserved, and the other part was lost during excavation.

Ilium (Fig. 9): The right ilium is almost completely preserved, except for its preacetabular process and a small portion of the dorsal margin. The posterior part of the dorsal margin shows that the dorsal margin of the ilium is not strongly convex. The supra-acetabular crest of the ilium is not developed (Fig. 9A), and there is no buttress between the preacetabular process and the supra-acetabular crest. Although the preacetabular process of the ilium is missing, its broken surface indicates that it is not long and it may not project further forward than the cranial end of the pubic peduncle, which is similar to the case in *Yunnanosaurus huangi* (Young, 1942). In dorsal view, the preacetabular process extends anterolaterally, and its postacetabular process extends medially; the transitional point is at the vertical level of the anterior margin of the ischiac peduncle of the ilium (Fig. 9C). This is different from that of *Yunnanosaurus huangi*, whose preacetabular process directs straight anteriorly and downwards (Young, 1942). The lateral surface above the acetabulum is concave, while the lateral surface of the pubic peduncle of the ilium is convex. The dorsal margin of the ilium is not expanded mediolaterally but becomes thinner towards the top (Fig. 9C). The highest point on the dorsal margin of the ilium lies caudal to the base of the pubic process. The ventral surface of the distal end of the postacetabular process is flat. The distal end of the postacetabular process is truncated with irregularly concave surface. The medial surface of the ilium is coarse, with a wide shallow groove present on the middle portion of the ilium (Fig. 9 B). The pubic peduncle is long, projects anteroventrally.

Immediately below the main body of the ilium, this process is slightly expanded transversely. In horizontal cross-section, the pubic peduncle has semi-circle outline formed by the nearly flat posterior surface and lateral, the anterior and medial surfaces that merge smoothly into each other. The distal end surface of the pubic peduncle is also semi-circular in outline (Fig. 9D). The dorsal and posterior parts of the acetabular surface are approximately flat transversely. The inner margin of the acetabulum extends lower than its outer margin. The acetabulum is broadly open as in *Yunnanosaurus huangi.* The anterior dorsal margin of the acetabulum is sculptured with short oblique ridges, and this is perhaps the trace of the supra-acetabular crest. The acetabular surface faces mainly ventrally. The ischiac peduncle is reduced dorsoventrally, but it broadens transversely. The distal end of the ischiac peduncle is similar to that of the pubic peduncle. Its lateral margin projects beyond the lateral surface of the rest of the ilium. A straight line extending through the articular surfaces of the pubic and ischiac peduncles passes much lower than the ventral surface of the posterior iliac lobe. There is no brevis fossa on the medial surface of the posterior lobe, and there is no brevis fossa on the ventral surface of the postacetabular process of the ilium either. The distal end of the caudal margin of the postacetabular process of the ilium is bluntly pointed.

Pubis (Fig. 10): The left pubis is almost complete, and the right pubis is not completely preserved. As in other prosauropods, the pubis is twisted along its length, with its proximal part forming a deep, thin, oblique subacetabular region that bears an obturator foramen (Galton and Upchurch, 2004). The pubis is much shorter than ischium. The length ratio of pubis to ischium is 0.82, indicating that it is relatively short. Proximally, the pubis bears a large shallowly concave, transversely expanded articulation for the pubis process of the ilium (Fig. 10 A, B). The width of the conjoined pubes is less than 75 percent of their length. There is no pubic tubercle on the lateral surface of the proximal pubis. The iliac peduncle sets anterior to the pubic apron creating a prominent inflection in the proximal anterior profile of the pubis. The position of the obturator foramen of the pubis is partially occluded by the iliac peduncle. The obturator foramen is relatively small. The lateral margin of the pubic apron in anterior view is straight. The orientation of the entire blades of pubic apron is transverse (Fig. 10C). The distal end of the pubis is much expanded. The lower 1/3 of the shaft is not fused with each other. The cross-section of the pubic shaft is triangular. The distal end of the pubis is rounded (Fig. 10D). The shaft of the pubis is slightly curved in lateral and medial views (Fig. 10A, B).

Ischium (Fig. 11): Both ischia are well-preserved. The shaft of the ischium is straight. There is no interischial fenestra. The pubic articulation of the ischium is elongated, triangular in outline. Laterally, the margin of this articulation is nearly flat, while its medial surface is moderately concave. The lateral surface of the proximal plate is moderately convex

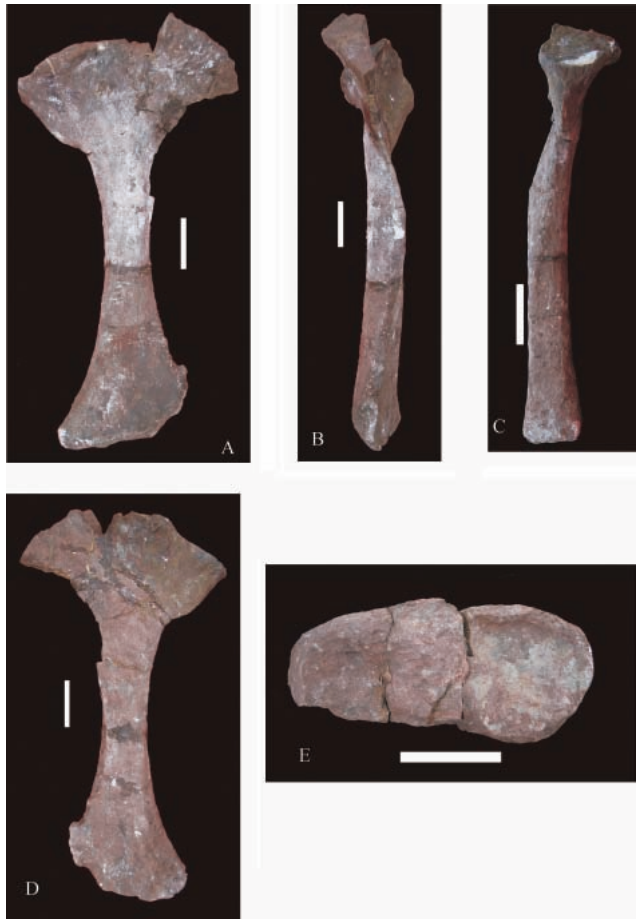

FIGURE 11. The left ischium of *Yunnanosaurus youngi* sp. nov. in **A,** lateral; **B**, anterior; **C**, posterior; **D**, medial; **E**, and distal end views. Scale bar = 10 cm.

dorsoventrally and as it approaches the acetabulum, turns gradually to extend anteriorly and medially. The articulation for the ilium is approximately sub-circular in outline. The pubic and iliac articulations are slightly concave. The proximal ends of the ischia are strongly expanded due to the extensions of the iliac and pubic articulations. It takes about half of the total length of the bone. The iliac articulation expands transversely, overhanging the lateral and medial margin of the proximal end. The medial surface of the proximal plate is concave dorsoventrally and anteroposteriorly. Especially, the shaft of the ischium is straight in posterior view (Fig. 11C). The anterior margin of the distal shaft is sharp and its posterior surface is flat without longitudinal grooves for the ischiocaudal muscular attachments as observed in *Yunnanosaurus huangi* (Young, 1942). The distal shaft of the ischium is triangular in transverse cross-section. The distal end of the ischium is foot-shaped in lateral view (Fig. 11A, D). The surface of the distal end of the ischium is concave and grossly trapezoidal in end view (Fig. 11 E), similar to that of *Yunnanosaurus huangi* (Young, 1942).

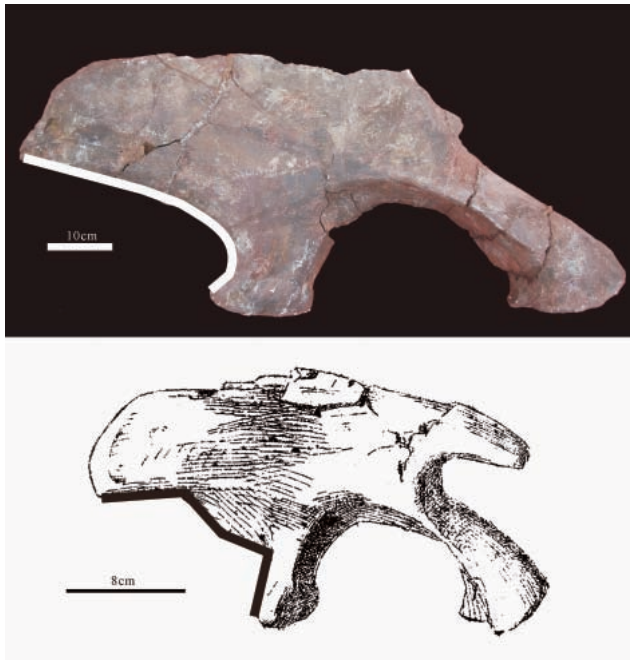

FIGURE 12. Ilium comparisons of **A,** *Yunnanosaurus youngi*; and **B,** *Yunanosaurus huangi,* showing the oblique M-shaped postoventral margin of the ilium (black line) in *Yunanosaurus huangi* (from Young, 1942).

DISCUSSION AND COMPARISON

Although the skull of *Yunnanosaurus youngi* is not preserved, the characters of the postcranial skeleton show that it is more close to *Yunnanosaurus* rather than to other prosauropod dinosaurs found from Yunnan Province. New material is assigned to *Yunnanosaurus* based on the following characters: the height of the centrum exceeds the length from the first to the sixth caudal vertebrae, the condition is reversed from the seventh caudal vertebrae (Young, 1942) and the height of the centrum exceeds the length in the last dorsal vertebra. These characters are only present in *Yunnanosaurus huangi,* and they are not found from other prosauropods from Yunnan, although these characters may be plesiomorphic.

The height exceeds the length of the last dorsal vertebra (Table 2) and anterior caudal vertebrae (Table 4) are one of the characters of the Yunnanosauridae. But this also exists in that of large sized melanorosaurid dinosaur *Camelotia borealis,* in which the height exceeds the length for the centra of the posterior dorsal and anterior caudal vertebrae (Galton, 1985). But the phylogenetic analysis shows that *Camelotia* and *Yunnanosaurus* are far away from each other in the parsimonious tree (Galton and Upchurch, 2004); this means that the height exceeds the length for the centra of the posterior dorsal and anterior caudal vertebrae are the plesiomorphic character.

Yunnanosaurus youngi displays the following derived characters: the distal ends of the sarcral ribs expanded anteroposteriorly and dorsoventrally, and they form into a sacrocostal yoke, the latter contacts with the inner surface of ilium, the ischium is longer than the pubis.

There is a weak ventral keel on the third cervical vertebra in *Yunnanosaurus youngi*; however, the ventral surface of the third cervical vertebra is smooth in *Yunnanosaurus huangi* (Young, 1942). The parapophysial facet of the most anterior dorsal vertebrae lies high above the suture of the neural arch at the anterior margin of the anterior vertebrae in *Yunnanosaurus huangi* (Young, 1942), whilst the parapophysial facets lie high above the neurocentral sutures from the fifth to thirteenth dorsal vertebrae in *Yunnanosaurus youngi,* thus the most anterior dorsal vertebra in *Yunnanosaurus huangi* may be the fifth dorsal vertebra, and the number of the dorsal vertebrae of *Yunnanosaurus huangi* is perhaps the same as *Yunnanosaurus youngi.* It is 14 rather than 15 as inferred by Young (1942).

The sacral vertebrae of *Yunnanosaurus youngi* are strongly fused and the sacral ribs form a sacrocostal yoke; therefore, all of them are tightly articulated. This is different from that of *Yunnanosaurus huangi,* whose sacral vertebrae are loosely articulated (Young, 1942). The first sacral vertebra of *Yunnanosaurus youngi* is shorter than the second and third sacral vertebrae which are the same in length, and a ventral groove appears on the first sacral vertebra, and the remaining two bear rounded and smoothly ventral surfaces, whilst in *Yunnanosaurus huangi,* their lengths increase posteriorly and the ventral surfaces of all the sacral vertebrae are rounded and smooth (Young, 1942).

In lateral view, the dorsal margin of the ilium is nearly straight in both *Yunnanosaurus huangi* (Young, 1942) and *Y. youngi,* but it is more convex in the small sized prosauropod *Gyposaurus sinensis* (Young, 1941b). The ventral margin of postacetabular process of ilium is slightly concave in *Yunnanosaurus youngi* (Fig. 9), whilst it is reversed V-shaped in *Yunnanosaurus huangi* (Young, 1942) and *Gyposaurus sinensis* (Young, 1941b). Thus, the postoventral margin (including the posterior margin of the ischiac peduncle) of the ilium in *Yunnanosaurus huangi* and *Gyposaurus sinensis* is forward oblique M-shaped in lateral view (Fig. 12).

The ischium is longer than the pubis. In prosauropods, the shaft of the pubis is moderately or markedly longer than the shaft of the ischium (Wilson and Sereno, 1998). The relatively shorter pubis is a derived character of *Yunnanosaurus youngi.* The ratio of the expanded proximal end to the whole length of the ischium is approximately 1/2 in *Yunnanosaurus youngi,* but it is only 1/3 in *Yunnanosaurus huangi* (Young, 1942). The posterior surface of the ischium is smooth in *Yunnanosaurus youngi,* however, it is marked by a longitudinal groove in that of *Yunnanosaurus huangi* (Young, 1942).

Yunnanosaurus youngi differs from *Yimenosaurus youngi* (Bai et al., 1990) in that three sacral vertebrae are fused and the first is the shortest, the last two are the same length in

Yunnanosaurus youngi, whilst only the first two sacral vertebrae are fused and the first sacral has a relatively long centrum and third sacral has the shortest centrum in *Yimenosaurus youngi* (Bai et al., 1990). The pubis and ischium lengths are equal in *Yimenosaurus youngi,* but the ischium is longer than pubis in *Yunnanosaurus youngi. Yunnanosaurus youngi* and *Yimenosaurus youngi* share one character: distal ends of sacral ribs fused together forming a sacrocostal yoke.

Yunnanosaurus youngi differs from *Jingshanosaurus xinwaensis* (Zhang and Yang, 1995) in that the length-height ratio for caudal dorsal vertebrae are greater than 1.0 (except for the last one, whose length-height ratio is less than 1.0) in *Yunnanosaurus youngi,* whilst the length-height ratios is less than 1.0 in *Jingshanosaurus xinwaensis* (Zhang and Yang, 1995; Galton and Upchurch, 2004). Both *Yunnanosaurus youngi* and *Jingshanosaurus xinwaensis* bear a massive sacrocostal yoke. As the condition in *Lufengosaurus, Yunnanosaurus huangi* and *Gyposaurus sinensis,* the postoventral margin (including the posterior margin of the ischiac peduncle) of the ilium in *Jingshanosaurus xinwaensis* is also forward oblique M-shaped in lateral view (Zhang and Yang, 1995).

Yunnanosaurus youngi differs from *Lufengosaurus* (Young, 1941a; 1947) in that the ischium is longer than pubis in *Yunnanosaurus youngi,* however, the ischium is shorter than pubis in *Lufengosaurus.* The postoventral margin (including the posterior margin of the ischiac peduncle) of the ilium in *Lufengosaurus* is forward oblique M-shaped in lateral view, although this condition is weak in *Lufengosaurus huenei* due to the poor preservation. The obturator foramen is very large in *Lufengosaurus* (Young, 1947), whilst it is relatively small in *Yunnanosaurus youngi.*

CONCLUSION

Although the skull of *Yunnanosaurus youngi* is not preserved, the postcranial characters indicate that it is more closely related to *Yunnanosaurus huangi,* rather than to other prosauropods from Yunnan Province, such as *Gyposaurus sinensis, Lufengosaurus huenei, Jingshanosaurus xinwaensis,* and *Yimenosaurus youngi.* Some characters such as the stout sacrocostal yoke, ischium longer than pubis, large body size (13 meters long), indicate that *Yunnanosaurus youngi* is more derived than the typical prosauropod dinosaurs. It is stratigraphically younger than *Y. huangi. Yunnanosaurus youngi* is not excluded the possibility of a basal sauropod, however, it is temporarily assigned to a new derived form of yunnanosaurids, due to the lack of skull.

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* : in Chinese with English summary