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THE GENUS *ELAPHE* IN THE CARPATHIAN BASIN: FOSSIL RECORD

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Abstract The oldest remains of the genus *Elaphe* from the Carpathian Basin is an indeterminate species (*Elaphe* sp.) known from the middle Miocene locality of Mátraszőlős 1 (MN 6). The younger deposits of the Neogene and Quaternary yielded several extinct (*E. kohfidischi, E. kormosi, E. praelongissima, E. szyndlari, E. paralongissima*) and extant members (*E. quatuorlineata, E. longissima*) of the genus. Based on the fossil record the extant species appeared in the area since the Upper Pliocene times only. A single extinct species known from the Quaternary is *E. paralongissima*, which based on vertebral characters could be the closest relative of *E. longissima*.

Introduction

In Europe the oldest remains referable to the genus *Elaphe* are known from the Middle Miocene of Oggenhausen (MN 5/6), Germany (Szyndlar & Böhme, 1993; Szyndlar & Schleich, 1993) and Sansan (MN 6), France (Augé & Rage, 2000). In the Eastern part of the continent the oldest remains come from the Late Miocene of Gritsev (MN 9), Ukraine (Szyndlar, 1991, and references therein). In the last fifteen years from the Neogene of Carpathian Basin few new extinct species, assigned to the genus *Elaphe* were described (Szyndlar, 1991; Bachmayer & Szyndlar, 1985, 1987; Venczel 1994, 1998). However most of the available Upper Pliocene and Quaternary remains belonged to extant members of the genus. The purpose of the present paper is to overview the available snake fossils

referable to the genus *Elaphe* described from the territory of the Carpathian Basin. In this respect we reviewed 34 localities of Middle Miocene – Holocene ages (Table 1) situated on the territory of Austria, Hungary and Romania (see Chart 1). The anatomical nomenclature used in the text follows Szyndlar (1984). The remains mentioned in this paper are housed in the following institutions: Geological Museum of Hungary (GMH), Budapest; Hungarian Natural History Museum (HNHM.), Budapest, Hungary; Institut für Paläontologie der Universität Wien (UWPI), Austria; Municipal Museum in Pásztó (MMP), Hungary; Țării Crişurilor Museum (MTC.), Oradea, Romania; Naturhistorisches Museum Wien (NMW), Austria; Institute of Systematics and Evolution of Animals of the Polish Academy of Sciences (ZZSiD), Krakow.

The fossil record

Elaphe kohfidischi Bachmayer et Szyndlar, 1985

1985 *Elaphe kohfidischi* Bachmayer et Szyndlar, pp. 80-84, fig. 1: 1–16, pl. 1: 1–3

1987 *Elaphe kohfidischi* Bachmayer et Szyndlar, pp. 26–29, fig. 1, pl. 1: 1, 2

1991 *Elaphe kohfidischi* Szyndlar, p. 118, fig. 16

Distribution: Upper Miocene of Central and Eastern Europe (MN 11 – MN 12)

Type material: holotype – a middle trunk vertebra (NMW No. 1984/96)

Referred material: Kohfidisch – 3 basiparasphenoid (NMW No. 1986/4/1, 2), 1 parietal fragment (NMW No. 1986/4/3), 2 basioccipital (NMW No. 1986/4/4), 2 maxillary fragments (NMW No. 1986/4/5,6), 2 dentary fragment (NMW No. 1986/4/7), 1 axis (NMW No. 1984/101/3), 1 trunk vertebra (NMW No. 1984/96), several hundred precaudal vertebrae (NMW No. 1984/101/1, 2, 4) and caudal vertebrae (NMW No. 1984/101/5).

Comments. Based on cranial bones this species shares a number of features characteristic for *Elaphe*, while its vertebrae mostly resemble *Coluber caspius* (Szyndlar, 1991). Several hundred vertebrae from the Late Miocene locality of Cherevichnoie (MN 12), Ukraine, were assigned with some doubt to this species too (Szyndlar & Zerova, 1992).

Elaphe kormosi (Bolkay, 1913) (Fig. 1)

1913 *Coluber kormosi* Bolkay, p. 224, pl. XII: 4–8

1932 *Elaphe longissima* Laurenti (= *Coluber Kormosi* By): von Szunyoghy, pp. 10, 49–50

1939 *Coluber kormosi* Bolkay: Kuhn, p. 18

1961 *Elaphe longissima* (Laurenti): Mlynarski, pp. 25–26

1963 ?«*Coluber*»*kormosi*: Kuhn, p. 21

1984 *Elaphe kormosi* (Bolkay): Rage, p. 46

1991 *Elaphe kormosi*: Szyndlar, pp. 118, 120

1994 *Elaphe kormosi*: Venczel, pp. 9–12, figs. 4, 5

Distribution: Late Miocene (MN 12) and Lower Pliocene (MN 14) of Hungary.

Type material: syntypes – Polgárdi 2: 1 basioccipital, 1 ectopterygoid, 1 fragmentary basiparasphenoid, 1 palatine fragment, one quadrate (GMH No. Ob. – 4465/ a-e)

Referred material: Tardosbánya 3: cranial bones, and vertebrae (HNHM., uncatalogued); Polgárdi 2: 15 vertebrae (GMH No. V. 19001); Osztramos 1/C: 1 supraoccipital, 10 vertebrae (HNHM., uncatalogued).

Comments: Part of the type material of Bolkay (1913) (one quadrate, one ectopterygoid and one premaxilla – GMH No. Ob – 4465/f-h) was allocated to *E. praelongissima* by Venczel (1994). Based on the available cranial bones *E. kormosi* resembles the larger members of the genus *Elaphe* (*E. longissima* and *E. quatuorlineata*), while its vertebrae approach in morphology to *Coluber* (*C. caspius* and *C. viridiflavus*) and to the extinct *E. kohfidischi*.

E. longissima (Laurenti, 1768) (Fig. 2)

1932 *Elaphe longissima* Laur.: von Szunyoghy, pp. 10, 49–50

1977 *Elaphe longissima* (Laurenti): Rabeder, p. 92, fig. 11: 4, pl. 1: 11

1984 *Elaphe longissima* (Laurenti): Szyndlar, pp. 86–97, fig. 34–37

1987 *Elaphe longissima* Laurenti: Venczel, pp. 580–581, fig. 2

1989 *Elaphe longissima* (Laurenti), 1768: Venczel, pp. 765–768, fig. 2–5

1990 *Elaphe longissima* (Laurenti), 1768: Venczel, p. 548, fig. 6

1991 *Elaphe longissima* (Laurenti, 1768): Szyndlar, p. 120

1991 *Elaphe longissima* (Laurenti, 1768): Venczel, p. 81

1992 *Elaphe longissima*: Venczel, p. 475

1995 *Elaphe longissima* (Laurenti, 1768): Venczel, pp. 78–90, fig. 23–26

2000 *Elaphe longissima*: Venczel & Damm, pp. 148–149

Type series: recent species

Fossil record: Upper Pliocene (MN 16) to Holocene

Material: Beremend 1: 1 parietal; Betfia 7 (upper layer): cranial bones and vertebrae (MTC., uncatalogued); Betfia X: 1 prootic sin (MTC. No. 18684); Somsich-hegy 2: (HNHM. uncatalogued); Subpiatră: 1 prootic sin (MTC. No. 16948), 1 fragmentary premaxilla (MTC. No. 16949), 80 vertebrae (MTC. No. 16949/1-80); St. Margarethen: 1 basioccipital, 1 quadrate (UWPI No. 2350/5/1-2); Braşov: 1 basiparashenoid; Chişcău 3: 1 quadrate, 13 vertebrae (MTC. uncatalogued); Râpa: 10 prefrontal + 1 fragment (MTC. No. 18799/1-11), 15 frontal + 2 fragments (MTC. No. 13665/1-17), 3 parietals + 2 fragments (MTC. No. 13666/1-5), 4 basioccipitals (MTC. No. 13667/1-4), 10 exoccipitals + 3 fragments (MTC. No. 18800/1-13), 3 supraoccipitals + 1 fragment (No. 18801/1-4), 2 basiparasphenoids + 3 fragments (MTC. No. 13669/1-5), 5 prootics (MTC. No. 13668/1-15), 7 maxillae + 5 fragments (MTC. No. 13670/1-12), 1 pterygoid + 2 fragments (MTC. No. 13671/1-3), 5 ectopterygoid (MTC. No. 13672/1-5), 9 palatines (MTC. No. 13673/1-9), 2 supratemporals + 1 fragment (MTC. No. 18802/1-3), 11 quadrates + 1 fragment (MTC. No. 13674/1-12), 20 dentaries + 5 fragments (MTC. No. 13676/1-25), 16 articulars + 4 fragments (MTC. No. 13675/1-20), 2 intranasals + 1 fragment (MTC. No. 18803/1-3), 1 premaxilla (MTC. No. 13677), 4 vomers + 4 fragments (MTC. No. 18804/1-8), 1 atlas (MTC. No. 18805), 7 axes (MTC. No. 18806/1-7), 3300 vertebrae (MTC. No. 13765), 1000 ribs (MTC. No. 13768); Vadu Crişului : 2 trunk vertebrae (MTC. No. 18817/1-2); Valea Morii: 5 vertebrae (MTC. No. 20743), 1 parietal (MTC. No. 20748), 1 quadrate, 1 palatine, 1 pterygoid, 32 vertebrae (MTC. No. 20755).

Comments: The remains closely resembles recent *E. longissima*, especially those coming from the Upper Pleistocene – Holocene deposits (Fig. 2)

Elaphe cf. E. longissima (Laurenti, 1768) (Fig. 3)

1974 *Elaphe* sp. (*E. longissima*): Rabeder, p. 148, fig. 1

1991 cf. *E. longissima* (Laurenti, 1768): Szyndlar, p. 120

1995 *Elaphe* cf. *E. longissima* (Laurenti, 1768): Venczel, pp. 90–92, fig. 27

1995 Elaphe cf. *longissima*: Jánossy, p. 93

1997 *Elaphe* cf. *E. longissima*: Venczel, p. 81, table 1.

Fossil record: Lower Pleistocene

Material: Osztramos 2b: 5 trunk vertebrae, 1 sacral vertebra (HNHM. uncatalogued); Osztramos 2 "Lower": 160 trunk vertebrae (HNHM. uncatalogued); Osztramos 2 "Upper": 5 trunk vertebrae, 1 sacral vertebra (HNHM.

uncatalogued); Osztramos 8: 1 cervical vertebra, 3 trunk vertebrae (HNHM. uncatalogued); Betfia XI: 3 basiparasphenoid fragment (MTC. No. 18690/1-3), 1 basioccipital (MTC. No. 18691), 3 quadrates fragments (MTC. No. 18692/1-3), 1 squamosal (MTC. No. 18693), 60 vertebrae (MTC. No. 18694/1-60; Betfia XII/B: 1 basiparasphenoid fragment (MTC. No. 18743), 5 vertebrae (MTC. No. 18744/1-5); Beremend 16: 3 trunk vertebrae (HNHM. uncatalogued).

Comments: All the remains resemble in morphology those of recent *Elaphe longissima*. However when the remains are analyzed more closely, certain differences between these and typical *E. longissima* may be evidenced (to exemplify this compare trunk vertebrae of Fig. 2 and 3). Probably all these differences do not exceed the limits of intraspecific variations.

Elaphe paralongissima Szyndlar, 1984 (Fig. 4)
1992 *Elaphe paralongissima*: Venczel, pp. 473–475, fig. 1
1995 *Elaphe paralongissima*: Venczel, p. 60–68, figs. 15–17
1998a *Elaphe paralongissima*: Venczel, pp. 149, 152–153, fig. 16–22.

Distribution: Lower Pleistocene of Hungary and Romania

Material: Betfia IX: 170 trunk vertebrae (MTC. No. 18660/1–170); Betfia pothole/A: 12 vertebrae (MTC. No. 18753/1-12); Betfia pothole/B:1 prootic fragment (MTC. No. 18769), 90 vertebrae (MTC. No. 18770); Betfia XII/A: 1 neurocranial fragment (MTC. No. 18732), 18 vertebrae (MTC. No. 18733/1–18); Betfia VII: 1 basiparasphenoid (MTC. No. 18626), 1 prootic (MTC. No. 18627), 1 parietal fragment (MTC. No. 18628), 373 vertebrae (MTC. No. 18629/1-373); Villány 8, layer 9-12: 1 basiparasphenoid, 2 quadrates, 1 compound bone, trunk vertebrae (GMH, uncatalogued).

Comment: Unfortunately from the type locality (Weze II) of *Elaphe paralongissima* only vertebrae are known (the holotype is a middle trunk vertebra) (Szyndlar, 1984). Thus the assignment of cranial bones (showing relatively large morphological variations), referred to this form in few subsequent papers (Venczel, 1992, 1995, 1998) can not be fully demonstrated.

Elaphe praelongissima Venczel, 1994 (Fig. 5)
1994 *Elaphe praelongissima*: Venczel, pp. 12–16, fig. 6–7
1998b *Elaphe praelongissima*: Venczel, pp. 11–12, fig. 7

Distribution: Late Miocene (MN 12) and Lower Pliocene (MN 14) of Hungary

Type material: holotype – Polgárdi 2 (MN 13): 1 basiparasphenoid (GMH No. V. 19004/Vt.149); Referred material: Tardosbánya 3: cranial bones, vertebrae (HNHM. uncatalogued); Polgárdi 2: 1 quadrate (GMH No. Ob–4465/f), 1 ectopterygoid (GMH No. Ob–4465/g), 1 premaxilla (GMH No. Ob-4465/h), 75 vertebrae (GMH No. V. 19003); Polgárdi 4 "Lower": 1 prootic (GMH No. V. 19005), 1 exoccipital (GMH No. V. 19666), 4 quadrate (GMH No. V. 19006), 1 vomer (GMH No. 19667), 1 dentary fragment (GMH No. 19007), 1 basiparasphenoid fragment (GMH No. V. 20626/a), 1 intranasal (GMH No. 20626/b), 40 vertebrae (GMH No. V. 19008); Polgárdi 4 "Upper": 2 compound bones (GMH No. V. 19009), 40 vertebrae (GMH No. V. 19010); Polgárdi 5: 2 vertebrae (GMH No. V. 20627/1-2); Osztramos 1/B: 1 prootic, 1 axis, 3 vertebrae (HNHM. uncatalogued); Osztramos 1/C – 1 exoccipital, 1 basioccipital, 16 vertebrae (HNHM. uncatalogued).

Elaphe quatuorlineata (Lacépède, 1789) (Fig. 6)

1974 *Elaphe* cf. *quatuorlineata* (Lacépède): Rabeder, p. 148, fig. 3

1991 *Elaphe quatuorlineata* (Lacépède, 1789): Szyndlar, p. 121, fig. 19

1992 *Elaphe quatuorlineata*: Venczel, pp. 475–476

1995 *Elaphe quatuorlineata* (Lacépède, 1789): Venczel, pp 68–78, fig. 19-21

1997 *Elaphe quatuorlineata*: Venczel, pp. 71, 81, 83–84, fig. 3

1998a *Elaphe quatuorlineata*: Venczel, pp. 149, 153, fig. 23–27

Type series: recent species

Material: Csarnóta 2 (MN 14): 1 vertebra (GMH uncatalogued); Bad Deutsch-Altenburg 20 (MN 16): skull bones, vertebrae (UWPI); Osztramos 2 "Lower": 1 cervical vertebra, 5 trunk vertebrae (HNHM. uncatalogued); Osztramos 14: 5 trunk vertebrae (HNHM. uncatalogued); Csarnóta 4: 3 trunk vertebrae (ZZSiD); Betfia XI: 11 vertebrae (MTC. No. 18689/1-11); Betfia IX: 2 basioccipitals (MTC. No. 18661/1–2), 2 ectopterygoids (MTC. No. 18662/1–2), 1 supraoccipital (MTC. No. 18663), 2 frontals (MTC. No. 18664/1–2), 1 compound bone (MTC. No. 18665), 80 vertebrae (MTC. No. 18666/1–80); Betfia pothole/A: 3 vertebrae (MTC. No. 18754/1–3); Betfia pothole/B: 1 basiparasphenoid (MTC. No. 18771), 3 frontals (MTC. No. 18772/1-3), 2 articular fragments (MTC. No. 18773/1–2), 1 quadrate (MTC. No. 18774), 1 prefrontal (MTC. No. 18775), 1 exoccipital (MTC. No. 18776), 1 nasal (MTC. No. 18777), 1 ectopterygoid fragment (MTC. No. 18778), 1 axis (MTC. No. 18779), 130 vertebrae (MTC. No. 18780/ 1–130); Betfia VII: 2 basiparasphenoid fragments (MTC. No. 18633/1–2), 1 frontal (MTC. No. 18630), 2 quadrates (MTC. No. 18631/1–2), 1 parietal

fragment (MTC. No. 18632), 1 exoccipital (MTC. No. 18634), 1 ectopterygoid (MTC. No. 18635), 1 prefrontal (MTC. No. 18636), 275 vertebrae (MTC. No. 18637/1–275); Villány 8 layer 9–12: 1 basiparasphenoid, 1 quadrate, trunk vertebrae (GMH); Betfia V: 123 vertebrae (MTC. No. 18613/1–123); Bad Deutsch-Altenburg 2–1 basiparasphenoid (UWPI).

Elaphe** cf. **quatuorlineata (Lacépède, 1789)
1991 *Elaphe* cf. *quatuorlineata* (Lacépède, 1789): Szyndlar, p. 121

Material: Villány 3 (MN 17) – 1 trunk vertebrae (ZZSiD)
Comment: According to Szyndlar (1991), the referred vertebra is rather fragmentary, thus its assignment to *E. quatuorlineata* can not be fully demonstrated.

Elaphe szyndlari Venczel, 1998 (Fig. 7)
1998 *Elaphe szyndlari*: Venczel, pp. 12–17, fig. 7–10

Distribution: Upper Miocene of Polgárdi 4 "Lower" and Polgárdi 4 "Upper" (MN 13)
Type material: holotype: Polgárdi 4 "Lower": one fragmentary basiparasphenoid (GMH No. V. 20628); paratype: Polgárdi 4 "lower": one basiparasphenoid (GMH No. V. 20629).
Referred material: Polgárdi 4 "Lower": one quadrate (GMH No. V. 20630), 2 compound bones (GMH No. V. 20631/1–2), 45 vertebrae (GMH No. V. 20632/1–45); Polgárdi 4 "Upper": one ectopterygoid (GMH No. V. 20633), one compound bone (GMH No. V. 20634), 7 vertebrae (GMH No. V. 20635/1–7)
Comments: Due to the character of the fossil material (dissociated skeletal elements) and because another member of the genus was described from these layers (*E. praelongissima*), it can not be excluded that some cranial bones referred to *E. szyndlari*, could belonged to the former.

Elaphe sp.
1999 *Elaphe sp.*: Venczel in Gál et al, p.
2000 *Elaphe sp.*: Venczel, in press

Material: Mátraszőlős 1 (MN 6): vertebrae (MMP, uncatalogued); Osztramos 1/C (MN 14): 2 vertebrae (HNHM. uncatalogued); Osztramos 1/E (MN 14) – 1 basiparasphenoid, 1 exoccipital, 1 frontal, 1 compound bone, 60 vertebrae (HNHM. uncatalogued).
Comments: The remains coming from Mátraszőlős 1 somewhat resemble larger members of the genus *Elaphe* (e.g. the hypapophysis of

cervical vertebrae projects anteroventrally) (Gál et al., 1999), while those originating from Osztramos 1 probably comprise more than one taxon (Venczel, in press).

Conclusions

Based on the available data in the Carpathian Basin the oldest remains referable to the genus *Elaphe* come from the Middle Miocene of Mátraszőlős (MN 6). However the presence of the latter became more evident since Late Miocene times when few new members reached the area from the East (or South-East). The latter fact could be in connection with major climatic and environmental changes of Late Miocene times, noticed even in the composition of the herpetofauna (Bachmayer & Szyndlar, 1985, 1987; Venczel, 1994, 1998b, 1999). However all Miocene members belonged exclusively to extinct species, while those referable to recent species appeared in the area during Pliocene times. The temperate-warm or temperate climate of the Pliocene and Lower Pleistocene made possible the presence in the area of *E. quatuorlineata* and the extinct *E. paralongissima* (the closest relative of *E. longissima*). The Carpathian Basin is inhabited today by a single member of the genus: *E. longissima*.

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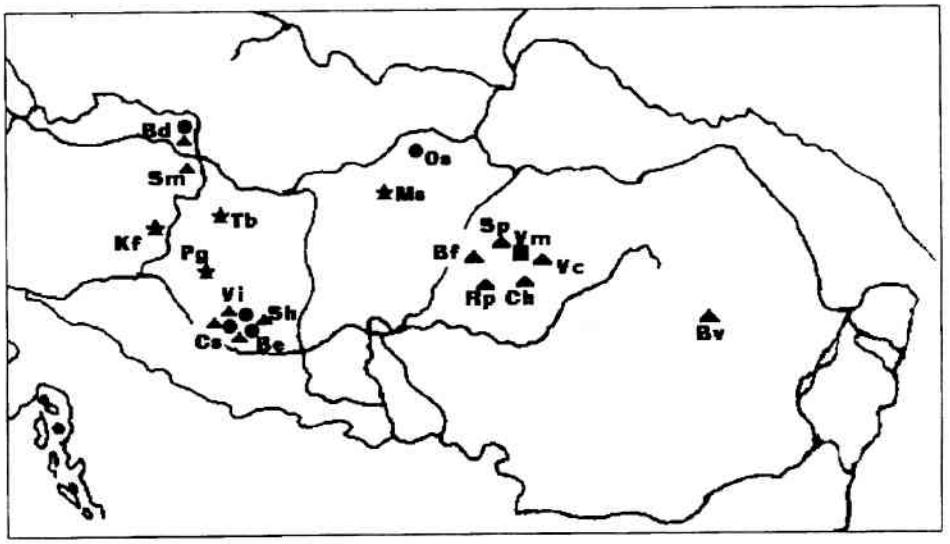

Fig. 1. **Fossil localities with Elaphe in the Carpathian Basin**
Austria: Bad Deutsch-Altenberg (Bd), Kohfidisch (Kf), St. Margareten (Sm)
Hungary: Beremend (Bd), Csarnóta (Cs), Mátraszőlős (Ms), Osztramos (Os), Polgárdi (Pg), Somsich-hegy (Sh), Tardosbánya (Tb), Villány (Vi)
Romania: Betfia (Bf), Braşov (Bv), Chişcău (Ch), Râpa (Rp), Subpiatră (Sp), Vadu Crişului (Vc), Valea Morii (Vm)
★ – miocene, ● – pliocene, ▲ – pleistocene, ■ – holocene

TIME (My)	EPOCHS		LAND MAMMAL AGES	Continental Biocronology in Central & Western Europe	GENUS *ELAPHE*								LOCALITY	MN/MQ ZONES
					Elaphe sp.	E. kohfid.	E. kormosi	E. szyndl.	E. praelon.	E. parelon.	E. long.	E. quatuor.		
	HOLO CENE			Arvicola terrestris									Valea Morii	
1	PLEISTOCENE	EARLY - LATE	TORIN GIAN	Arvicola terrestris									Vd, Rp	MQ 2
				Arvicola cantianus									Sm, Ch 3, Sp	
			BIHARIAN	Mimomys savini									Bd 2	MQ 1
				Mimomys pusillus + savini									Bf V, Vi 8, Sh 2, Bf, XII, XI, VII, IX, X, Os 2, 8, 14,	
2	PLIOCENE	EARLY - LATE	VILANYIAN/ VILLAFRAN-CHIAN	Mimomys pliocaenicus									Villány 3	MN 17
				Mimomys polonicus									Bad Deutsch - Altenburg 20 Beremend 1	MN 16
3				Mimomys hassiacus + stehlini										
4			RUSCINIAN	Mimomys hassiacus + gracilis										MN 15
				Mimomys davakosi										
5				Promimomys cor									Csarnóta 2, Osztramos 1	MN 14
				Promimomys insuliferus										
6	MIOCENE	LATE	TUROLIAN	Stephanomys ramblensis									Polgárdi 2, 4, 5	MN 13
				Parapodemus gaudryi									Tardosbánya 3	MN 12
7				Parapodemus lugdunensis									Kohfidisch	MN 11
8			VALLE-SIAN	Progonomys hispanicus										MN 10
9				Microtocri-cetus mollasicus										MN 9
10		MIDDLE	ASTRACIAN	n.n.									Mátraszőlős1	MN 7/8
11														MN 6 (part)

Table 1. **Fossil record of *Elaphe* and biostratigraphic position of the studied fossil localities.** Abbreviations as in Figure 1.

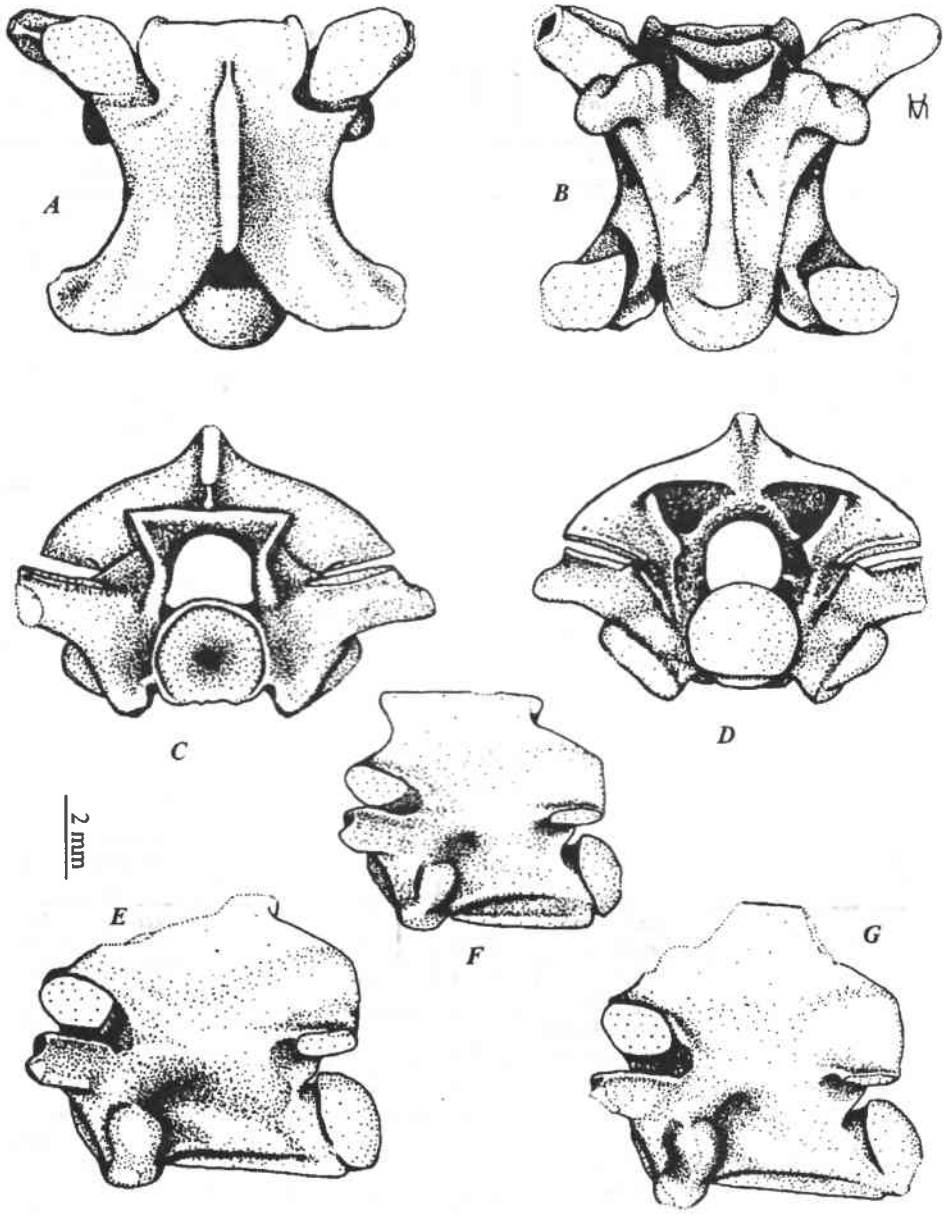

Fig. 2. ***Elaphe kormosi.*** A-E, G: middle trunk vertebra; F: posterior trunk vertebra (Polgárdi 2, GMH. No. V. 19001/a-c). A – dorsal view, B – ventral view, C – anterior view, D – posterior view, E, F, G – lateral views.

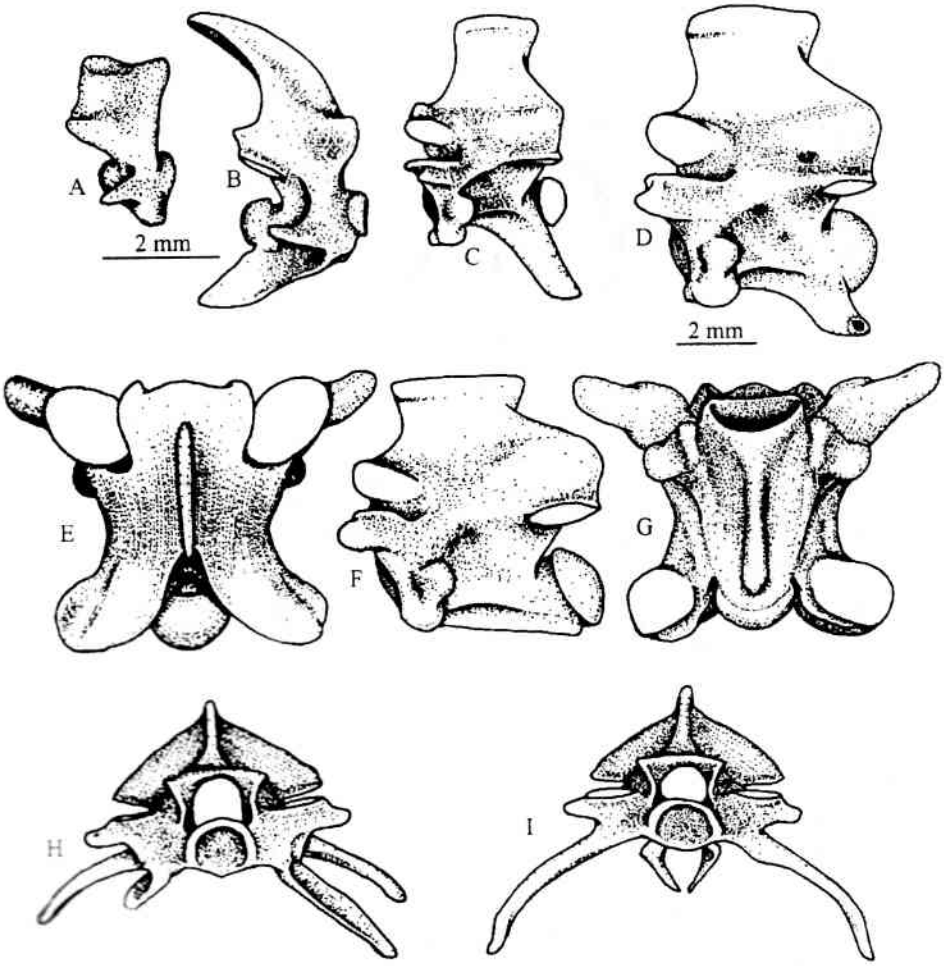

Fig. 3. **Fossil remains of *Elaphe longissima* from Râpa.** A: atlas (MTC. No. 18805); B: axis (MTC. No. 18806/1); C, D: cervical vertebrae (MTC. No. 13765/1,2); E–G: trunk vertebra (MTC. No. 13765/3); H: sacral vertebra (MTC. No. 13765/4); I: caudal vertebra (MTC. No. 13765/5). A-D, F – lateral views; E – dorsal view; G – ventral view; H, I – anterior views.

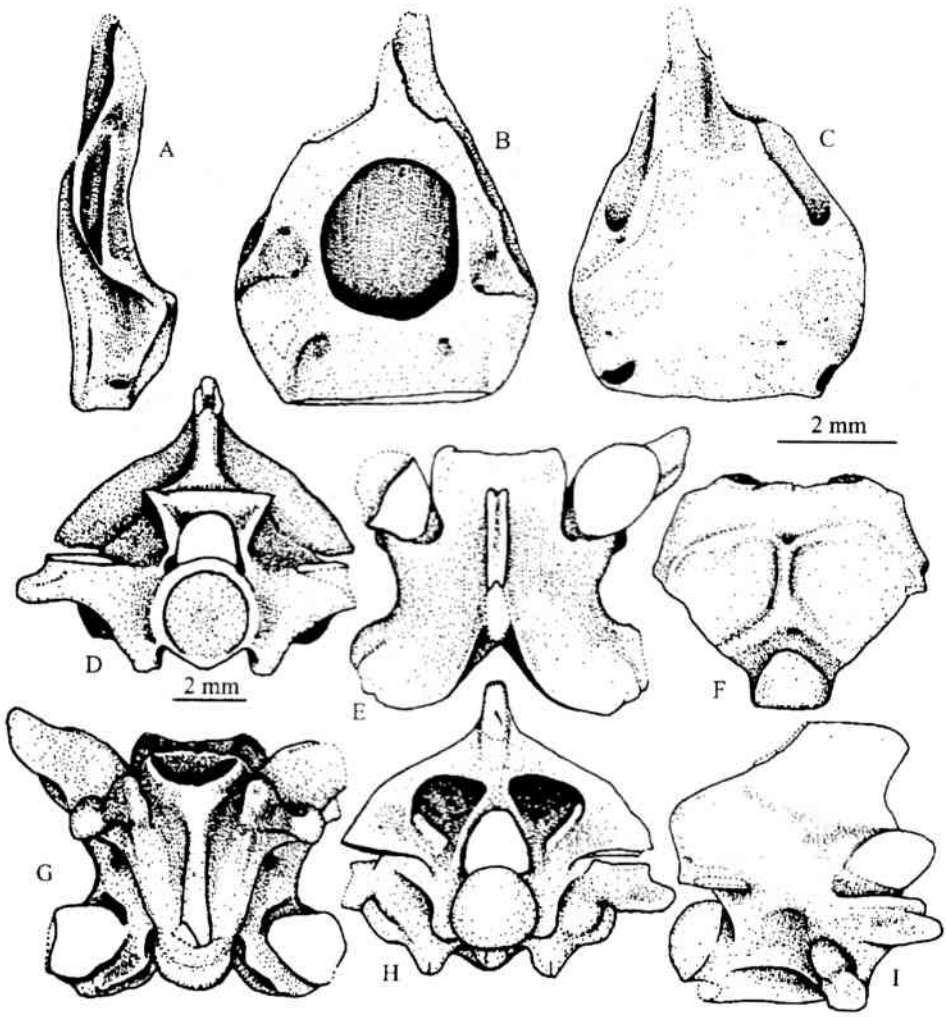

Fig. 4. ***Elaphe* cf. *E. longissima*.** A-C: fragmentary basiparasphenoid (Betfia 12/B, MTC. No. 18743); D, E, G–I: trunk vertebra (Betfia 12/B, MTC. No. 18744); F: basioccipital (Betfia 11, MTC. No. 18691). A, I – lateral views; B, E – dorsal views; C, F, G – ventral views; D – anterior view; H – posterior view.

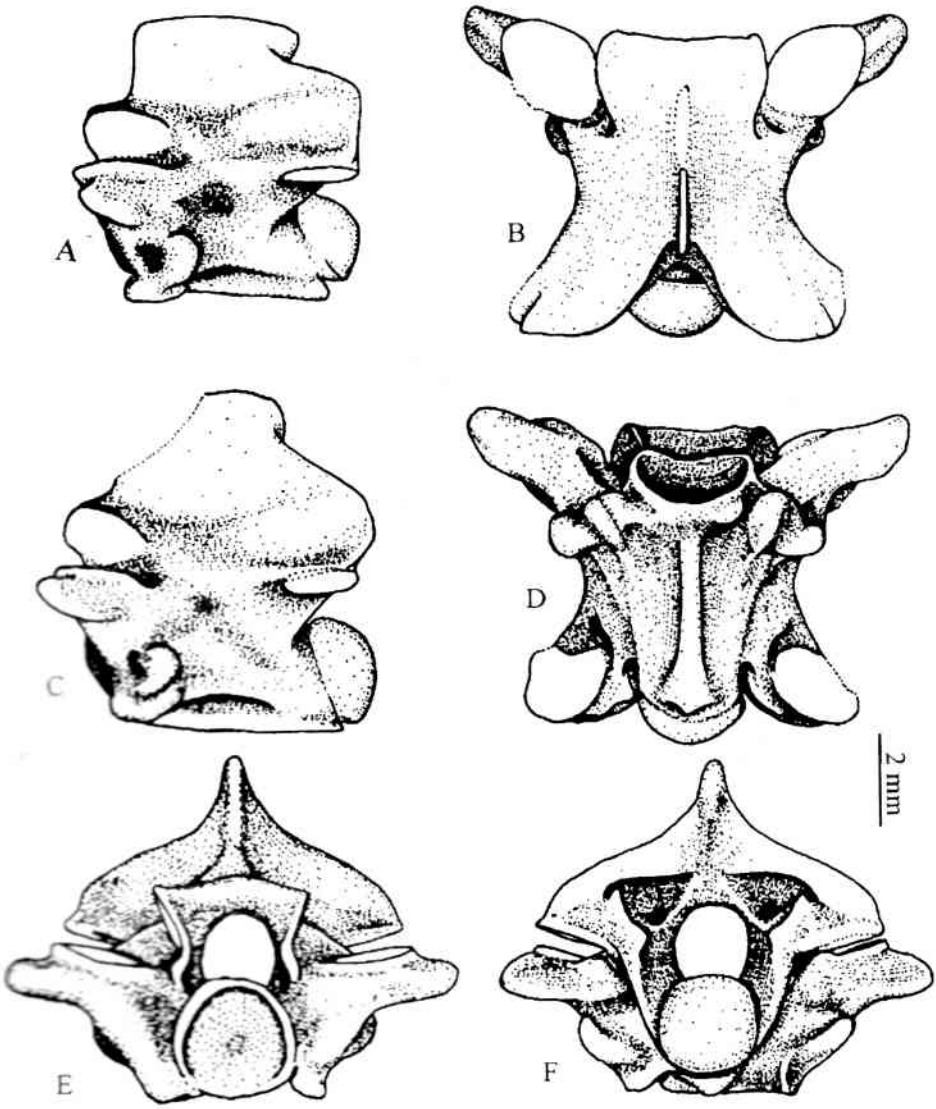

Fig. 5. ***Elaphe paralongissima.*** A–F: trunk vertebrae (Betfia 7, MTC. No. 18629/3,4). A, C – lateral views; B – dorsal view; D – ventral view; E – anterior view; F – posterior view.

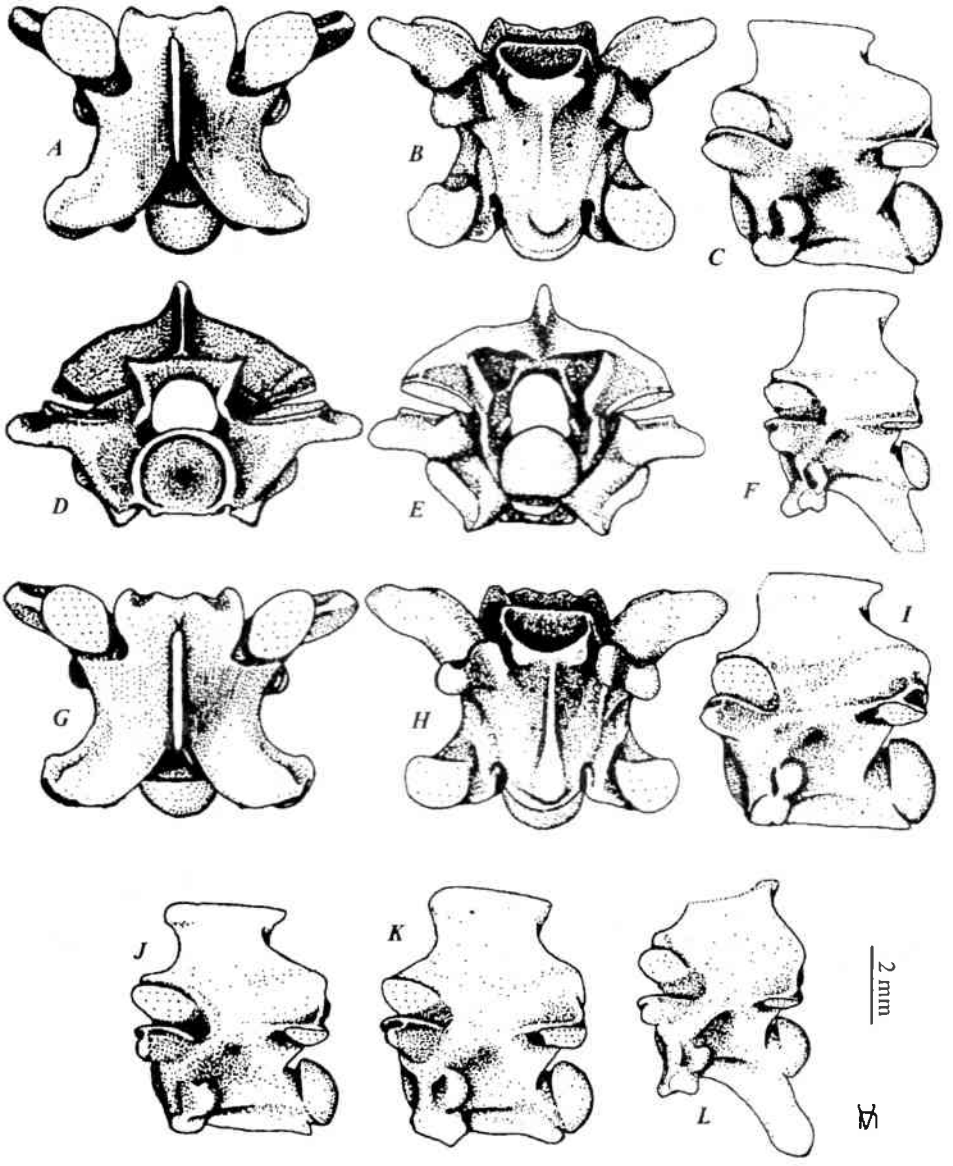

Fig. 6. ***Elaphe praelongissima.*** A–E, G, H, I, J: middle trunk vertebrae (Polgárdi 4 "Upper" GMH. No. V. 19010/a-d); F, L: cervical vertebrae (Polgárdi 4 "Lower", GMH. No. V. 19008/b, c); K: middle trunk vertebra (Polgárdi 4 "Lower", GMH. No. V. 19008/a). A, G – dorsal views; B, H – ventral views; C, F, I, J, K, L – lateral views, D – anterior view; E – posterior view.

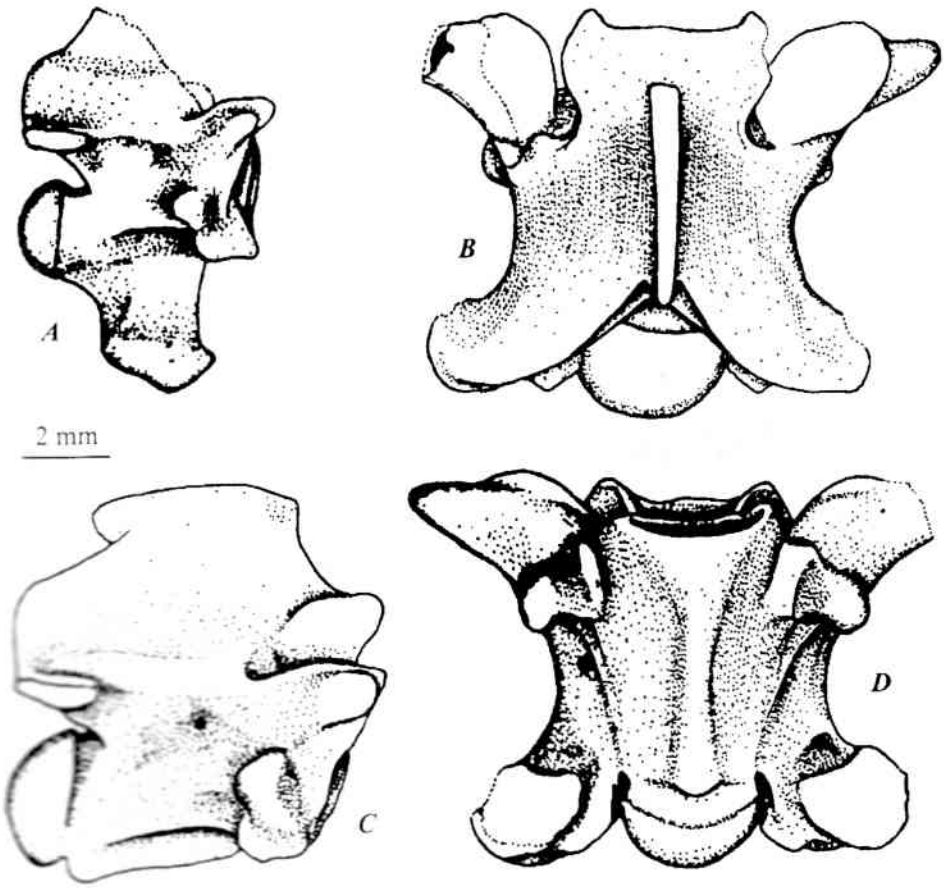

Fig. 7. ***Elaphe quatuorlineata*** **from Osztramos 2 "Lower" (HNHM).** A: cervical vertebra, B–D: middle trunk vertebra. A, D – lateral views; B – dorsal view; C – ventral view.

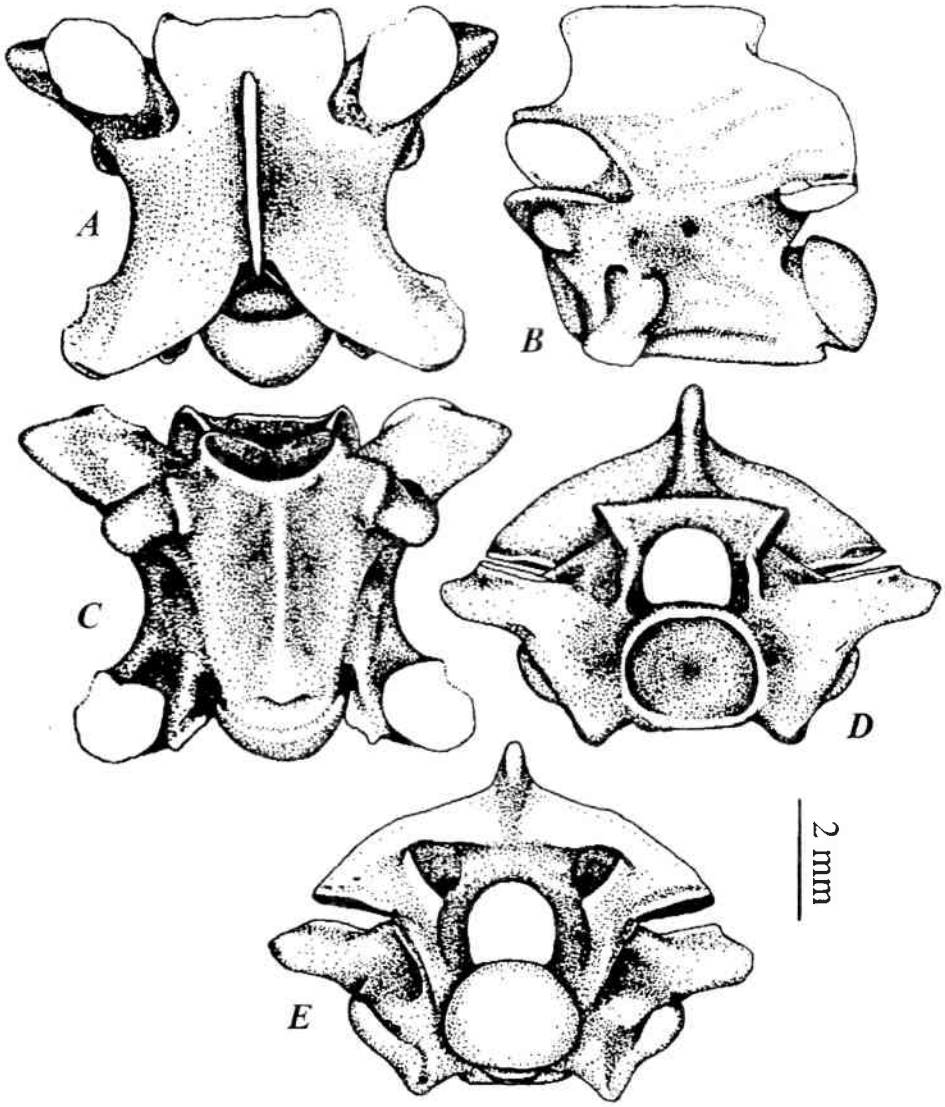

Fig. 8. ***Elaphe szyndlari.*** A–E: middle trunk vertebra (Polgárdi 4 "Upper", GMH. No. V. 20635/1). A – dorsal view, B – lateral view, C – ventral view, D – anterior view, E – posterior view.