

**A PRELIMINARY STUDY ON THE OSTEOLOGY OF NOSE-  
HORNED VIPER  
(VIPERA AMMODYTES AMMODYTES L, 1758)  
FROM BOIU DE SUS, ROMANIA**

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**INTRODUCTION**

During field work a small population of nose-horned viper (**Vipera ammodytes ammodytes**) was discovered near the village of Boiu de Sus (Gurasada), Hunedoara county, locality situated at the northern limit of its areal (Ghira, 1992). In the studied area another member of the genus (**Vipera berus berus**) occurs in a limited number (approximately 3% of the viper population).

The population of nose-horned viper from Boiu de Sus shows some external morphological features (e.g. reduced head width/head length ratio, divided supraocular scales in 50% of the studied specimens, numerous melanistic individuals with reduced nasal process), which are extremely rare in typical **V. ammodytes ammodytes** (Ghira, supra cit.).

The purpose of the present article is to complete the external morphological studies with observations made on nose-horned viper skeletons, coming from the studied area.

**MATERIAL AND METHOD**

The skeleton of four specimens (two males and two females) coming from Boiu de Sus has been prepared. The basiparasphenoids and vertebrae were compared with all the living „European vipers" (sensu Groombridge, 1986). In order to calculate the centrum length/centrum width ratio, in each specimen the centrum length and centrum width of 50 vertebrae (between the 50th and 100th presacral vertebrae) has been measured. The anatomical nomenclature and the methodology of measurements of snakes vertebrae are given after Szyndlar (1984).

**RESULTS AND DISCUSSION**

**The basiparasphenoid:** This bone is of special taxonomic importance in snakes (Underwood, 1967). The posterior orifices of the Vidian canal (situated anteriorly), as typical for vipers is distinctly separated off from the cerebral foramina (situated posteriorly). In the „European vipers" (sensu Groombridge, 1986) these foramina usually are not covered by a bony crest.

The basiparasphenoids of the specimens from Boiu de Sus show a high morphological variability. They differ from each other and from the typical **Vipera ammodytes ammodytes** in some details:

- the suborbital flange in the R-MTC 95 specimen ( $\sigma$ ) is weakly defined (Fig.1: a)

- the cerebral foramina in the R-MTC 95 and R-MTC 96 specimens ( $\sigma\sigma$ ) are very large (Fig.1:a and b), condition never observed in the available comparative materials.

- the basipterygoid processes and the basisphenoid crest in the R-MTC 105 specimen ( $\varphi$ ) are reduced (Fig.1: d), condition comparable to **Vipera berus**.

**The vertebrae:** The morphology and measurements of the vertebrae in the R-MTC 95, R-MTC 96 and R-MTC 104 specimens approach the condition observed in **Vipera ammodytes ammodytes**. The hypapophyses of the cervical vertebrae are longer than the centrum, while the neural spine is at least as high as long (Szyndlar, 1984). The hypapophyses of the trunk vertebrae are directed postero-ventrally and remain straight even in the posteriormost trunk vertebrae, being curved posteriorly in **V. aspis**, **V. latastei** and **V. berus**. The centrum length of the above specimens range between: 4.3-4.78 mm (R-MTC 95), 4.52-4.93 mm (R-MTC 96) and 3.72 -3.97 mm (R-MTC 104); while the centrum width between: 3.2-3.59 mm (R-MTC 95), 3.1-3.42 mm (R-MTC 96) and 2.52-2.81 mm (R-MTC 104). The centrum length/centrum width ratio ranges between: 1.26-1.49 ( $X=1.33$ ) in the R-MTC 95 specimen, 1.40-1.47 ( $X=1.42$ ) in the R-MTC 96 one, while 1.34-1.56 ( $X=1.43$ ) in the R-MTC 104 one. In the few available recent specimens of **V. ammodytes ammodytes** and **V. ammodytes montandoni** the mean of the centrum length/centrum width ratio never reaches 1.60, observation concordant with that of Szyndlar (1984, 1991).

In the R-MTC 105 specimen the hypapophyses are shorter than the centrum, including the anterior cervical vertebrae. The hypapophyses of the trunk vertebrae are not curved posteriorly, but are comparatively shorter than in typical **V. ammodytes ammodytes** (Fig. 2). The centrum length of the above specimen ranges between: 4.4-4.73 mm, while the centrum width between 2.5-2.76 mm. The centrum length/centrum width ratio ranges between 1.6-1.82 ( $X=1.72$ ), which is significantly higher in **V. ammodytes**. In **V. berus** and **V. ursinii** the mean of the centrum length/centrum width ratio in the trunk vertebrae approaches 1.80 (Szyndlar, 1984, 1991).

## CONCLUSIONS

The morphology of the basiparasphenoid and especially the size of the cerebral foramina in the male specimens differ significantly from that of **Vipera ammodytes** (the latter features never reported in viperinae snakes).

The R-MTC 105 specimen, regarding the shape and morphology of its basiparasphenoid and vertebrae (with high centrum length/centrum width ratio

of the middle trunk vertebrae) may be considered a veritable hybrid between **V. ammodytes ammodytes** and **V. berus berus**.

The observations must be extended and completed with cytogenetical, ethological, immunological, etc. studies

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### FIGURE CAPTIONS

*Figure 1:* Basiparaspheonoids of nose-horned viper from Boiu de Sus (all in ventral view). a: specimen R-MTC 95; b: specimen R-MTC 96; c: specimen R-MTC 104; d: specimen R-MTC 105.

*Figure 2:* Vertebrae of the specimen R-MTC 105, from Boiu de Sus (all in lateral view).

*Figura 1.* Baziparaspheonoidele viperelor cu corn de la Boiu de Sus (vedere ventrală). a: exemplarul R-MTC 95; b: exemplarul R-MTC 96; c: exemplarul R-MTC 104; d: exemplarul R-MTC 105.

*Figura 2.* Vertebrele exemplarului R-MTC 105, de la Boiu de Sus (vedere laterală).

## STUDIU PRELIMINAR ASUPRA ŐSTELOGIEI POPULAŢIEI DE VIPERE CU CORN (**VIPERA AMMODYTES AMMODYTES** LINNAEUS, 1758) DE LA BOIU DE SUS, ROMÂNIA

### REZUMAT

Lucrarea prezintă caracteristicile osteologice a 4 vipere cu corn (trei dintre ele au aspectul obişnuit al lui **V. ammodytes**, iar a 4-a, adică exemplarul R-MTC 105, are procesul nazal redus şi coloritul este melanistic) recoltate de la Boiu de Sus, Jud. Hunedoara. Baziparaspheonoidele şi vertebrele sunt comparate cu celelalte vipere europene (conform cu Groombridge, 1986). Nomenclatura anatomică şi metodologia măsurilor vertebrelor a fost cea descrisă de Szyndlar (1984).

La exemplarele studiate, **baziparasfenoidul** diferă unul de celălalt și toate 4 diferă net de forma tipică a lui **V. ammodytes** prin următoarele detalii:

- flancul suborbital la R-MTC 95 ( $\sigma$ ) este slab definit;
- foramina cerebrală la R-MTC 95 și R-MTC 96 ( $\sigma\sigma$ ) este foarte mare; procesele

bazipterigoide și creasta bazisfenoidului la R-MTC 105 ( $\varphi$ ) sunt reduse, ca și la **V. berus**.

Măsurătorile vertebrelor la R-MTC 95, 96 și 104 se apropie de **V. ammodytes**. La exemplarul R-MTC 105 hipapofizele sunt mai scurte decât centrul chiar și la vertebrele cervicale anterioare. Hipapofizele vertebrelor trunchiului nu sunt curbate posterior, însă sunt mai scurte decât la **V. ammodytes** tipică. Raportul între lungimea și lățimea centrului vertebrei este: 1.6-1.82 cu media 1.72, valori care diferențiază net exemplarul 105 de **V. ammodytes**, apropiindu-l de **V. berus** și **V. ursinii**, la care raportul lungimea/lățimea centrului vertebrei se apropie de 1.80 (Szyndlar, 1984, 1991).

În concluzie, exemplarul R-MTC 105 poate fi considerat un veritabil hibrid între **V. ammodytes ammodytes** și **V. berus berus**.

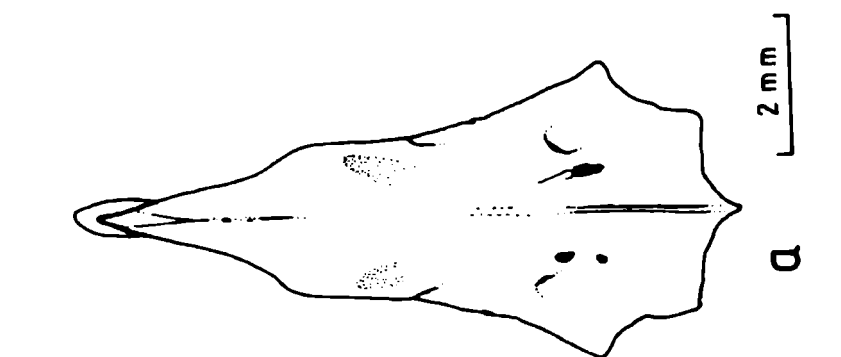
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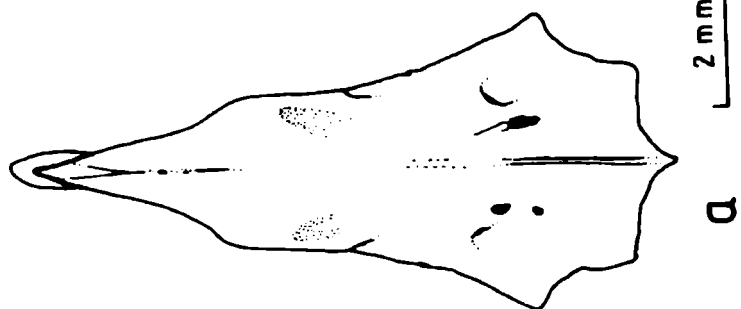
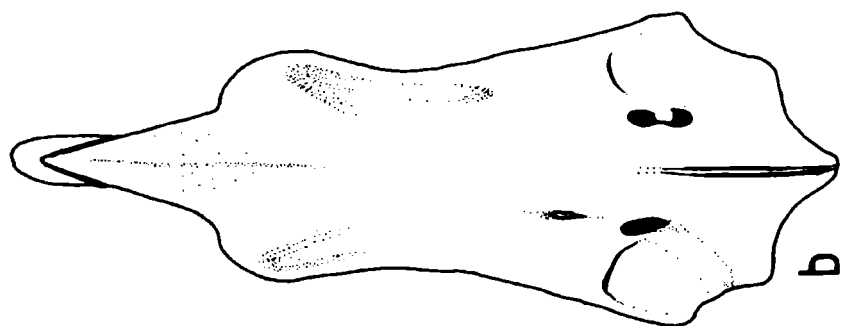
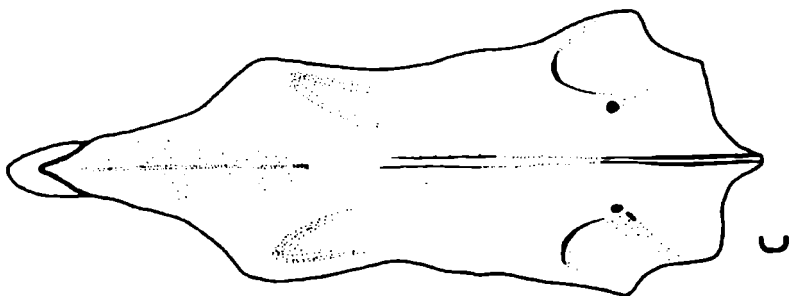
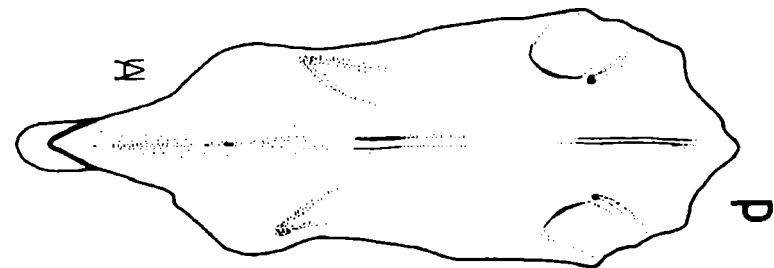
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*Fig. 1*



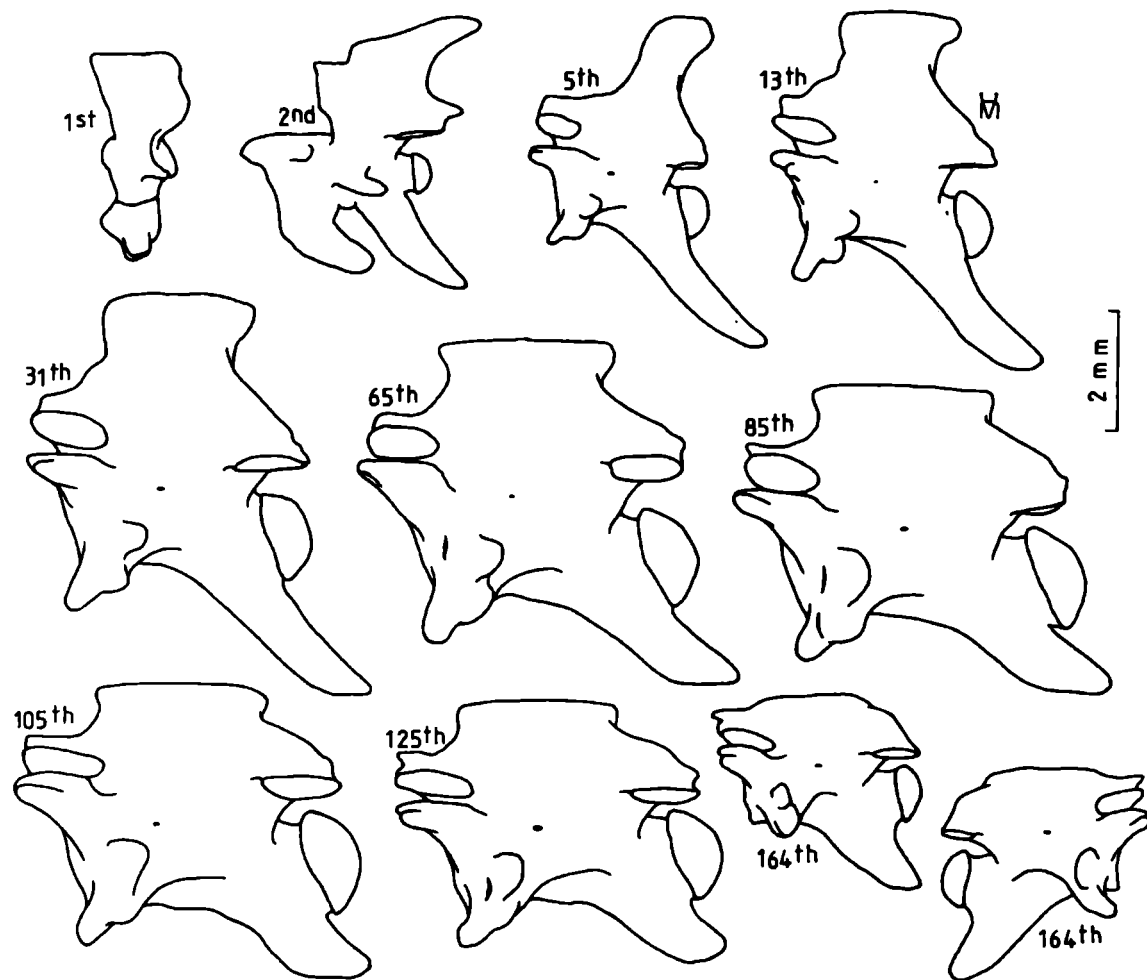


Fig. 2