Remarks on the genital morphology of the Malagasy snake genus *Liophidium* (Reptilia, Serpentes, Colubridae)

Beitrag zur Genitalmorphologie der madagassischen Schlangengattung *Liophidium* (Reptilia, Serpentes, Colubridae)

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Within the framework of our genital morphology investigations on Malagasy snakes, we re-examined the remarkable hemipenes of *Liophidium apparti* (MHNP 1982-443) and *L. trilineatum* (MHNP 1982-444), which were illustrated by DOMERGUE (loc. cit., 1113).

In accordance with DOMERGUE (loc. cit.) the hemipenes of *L. apparti* are characterized by a very short, unpaired peduncle and two extremely long and slender lobes, which are entirely covered with spines ("...spinesuses sur toute leur surface..."). According to DOMERGUE (loc. cit.) the only difference in hemipenis morphology of *L. apparti* and *L. trilineatum* are the relatively longer lobes of *L. apparti*, which furthermore are not asymmetricaly formed as in *L. trilineatum*.

These observations were largely confirmed by our examinations. In fact the tips of the lobes of the hemipenes do not seem to be fully evaginated, but the shortening of the inner lobe of *L. trilineatum* is obvious. However this is not the only distinctive feature between the hemipenes of *L. apparti* and *L. trilineatum*. The hemipenes of *L. apparti* show relatively longer and more slender spines, which do not cover the entire hemipenis as in *L. trilineatum*. In the hemipenis of *L. apparti* merely the lateral surface is covered with spines, the surrounding area of the sulcus spermaticus and the corresponding area on the adaxial surface are spineless. This important distinctive feature, which was not mentioned by DOMERGUE (loc. cit.), makes a (hemipenis) distinction of the externally very similar species possible even if hemipenis lobes are only partially evaginated.
According to the drawings by DOMERQUE (loc. cit.) the hemipenis of L. orthocerus appears to be relatively primitive within the genus Lipophilium, because of the largely regular, strong spines and the simple shape of the lobes. In the hemipenis of L. varians the arrangement of the small spines and the simple shape of the lobes are absent. In the hemipenis of L. varians the shape of the lobes is more complicated. On the other hand, the hemipenis of L. perplexus (anterior) of the lobes is more elongated and slender than the lobes of L. varians. The special arrangement of the small spines and on the other hand, the hemipenis of L. varians with its extremely long and slender lobes is the most derived. Comparing the hemipenis of L. varians with the hemipenis drawings by DOMERQUE (loc. cit.), there is a close relationship to L. varians, but in the hemipenis of L. varians the arrangement of the spines seems to be more complicated. Further, it has to be mentioned that the corresponding lobes of the hemipenis drawings by DOMERQUE (loc. cit.) and both lobes of the hemipenis of L. varians, which is illustrated here for the first time, show somewhat different lengths. This can be interpreted as a preliminary stage to the exceptionally asymmetrical formation of the lobes in the hemipenis of L. varians. For conclusive analyzing the systematic situation within Lipophilium and related genera (e.g. Lipophilidae) further hemipenis morphology studies are needed (see also CADDLE, J. E., 1996: Bull. Mus. Comp. Zool. 154, 389-464).

DOMERQUE (loc. cit.) emphasizes the diverse and partly extremely shape of the hemipenis within the genus Lipophilium. The diversification of the hemipenis is remarkable and it is not possible to recognize a certain element of variation due to the different hemipenis morphology. Therefore, the classification of the hemipenis is based on a holistic approach and the different hemipenis morphology are classified according to the genus to be necessary. But merely different features do not necessarily justify higher systematic categories, especially as important hemipenis ornaments (e.g. spines, length of the lobes, etc.) essentially show the same principle.

The hemipenis morphology situation of the African species Melanophryne and Melanophryne guttata also is comparable to the phenomenon in the genus Lipophilium discussed before (DOMERQUE, J. E., 1996: Acta Tropica 29). So the hemipenis of M. guttata corresponds to the hemipenis of L. orthocerus (DOMERQUE, J. E., 1116) to a large extent, whereas the hemipenis of M. guttata is characterized by extremely long and slender lobes, corresponding to the hemipenis of L. varians. Likewise within the genus Proximus (COPE, E. D., 1900: Rep. U.S. Natl. Mus., Washington 1899, 151-1294, plate 22) and Duits (DOMERQUE, J. E.) there are hemipenis with exceptionally long and slender lobes. It has to be still to be clarified whether these phenomena are phylogenetically related features or whether functional aspects are of significance and thus the character is adaptive and subject to selective pressure under certain ecological conditions. In view of the obviously multiple origin of such remarkable hemipenes, it could be possible, that such a phenomenon for an effective reproductive apparatus, which could be understood in connection with an optimized fertilization success (see also BOHME, W., SILLING, U., 1993: Herpetofauna 15: 15-23, ZIEGLER, J. C.)

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