

# **Pheromone communication, functional morphology of genitalia, and mating behavior in snakes of the family Viperidae in Bulgaria**

**Kostadin Andonov**

## **SUMMARY**

Many species of the family *Viperidae* have been the focus of diverse studies, yet information on their chemical communication, its relation to courtship behavior, and the morphology of the reproductive organs remains limited. In Europe, such research has mainly concerned the genus *Vipera*, providing data on courtship and intraspecific communication but not on the specific chemical components of pheromonal complexes. European species of the genus exhibit distinctive courtship behavior and elaborate mating rituals, which, together with the morphological characteristics of the male genitalia, make them a valuable model for studying chemical communication.

In the present work, the female genitalia of two *Vipera* species — *Vipera ammodytes* and *Vipera berus* — are described for the first time and compared with those of five other snake species inhabiting Bulgaria. In addition, the skin secretions of these two *Vipera* species are characterized for the first time and compared with the skin secretions of eleven other snake species, also newly described as part of this study. The role of long-chain, heavy, and low-volatility ketones in intraspecific communication and their participation in the female sex pheromone have been demonstrated, along with a description of the species' courtship behavior. Among the important findings of the dissertation is the absence of a statistically significant difference between the ketones identified in the skin secretions of male and female individuals, which opens avenues for further research.