



Morphological changes of the male reproductive system in *Hyalomma asiaticum* at different developmental stages*

YI-MAN SHAN, YUN-FENG HOU, XIN-YU HU, JING-ZE LIU* & FANG WANG*

Hebei Key Laboratory of Animal Physiology, Biochemistry and Molecular Biology, Hebei Collaborative Innovation Center for Eco-Environment, Ministry of Education Key Laboratory of Molecular and Cellular Biology, College of Life Sciences, Hebei Normal University, Shijiazhuang, Hebei Province, 050024, China

*Corresponding authors, Jing-Ze Liu; liujingze@hebtu.edu.cn; <https://orcid.org/0000-0002-0923-1775>

Fang Wang; wangf0110@163.com; <https://orcid.org/0000-0002-5758-7434>

*In: Zhang, Z.-Q., Fan, Q.-H., Heath, A.C.G. & Minor, M.A. (Eds) (2022) *Acarological Frontiers: Proceedings of the XVI International Congress of Acarology (1–5 Dec. 2022, Auckland, New Zealand)*. Magnolia Press, Auckland, 328 pp.

Hyalomma asiaticum is considered as the vector tick species which can carry and transmit *Theileria annulata*, *Anaplasma marginale* and Crimean-Congo hemorrhagic fever virus to humans and animals, causing a great risk to animal husbandry and posing a threat to public health as well as economic losses. In the present study, we investigated the morphology and changes of the male reproductive system for this species at different developmental stages. The results showed the male reproductive system of *H. asiaticum* consisted of a pair of testes, vasa deferentia, seminal vesicles, ejaculatory duct, and a central accessory gland complex, which was multilobulated and consisting of the middle lobes (single fore-dorsal lobe, a pair of mid-dorsal lobes and a pair of hind-dorsal lobes) and the lateral lobes (a pair of dorsolateral lobes, a pair of posterolateral lobes, and a pair of anteroventral lobes). During the various developmental stages, the testes were the smallest in the unfed stage and became significantly larger after 3 days of blood feeding, reaching the maximum after 6 days of feeding. After mating, and about 10 days of feeding, the testes got smaller. In addition, the six lobes of the accessory gland complex gradually increased from the first day to the sixth day after feeding. What's more, from 6 to 10 days, the fore-dorsal lobes, mid-dorsal lobes and posterolateral lobes still increased, while the hind-dorsal lobes, dorsolateral lobes and anteroventral lobes decreased by degrees. This study described the male reproductive system of *H. asiaticum*, and explored the effect of blood feeding on the development of the testes and accessory gland complex, which will provide a foundation for future studies of male reproductive system of ticks and even tick control.

Keywords: Morphological changes, *Hyalomma asiaticum*, male reproductive system, developmental stages

Acknowledgements

This work was supported by the Science and Technology Project of Hebei Education Department (Grant number BJ2020052).

References

- Kamani, J., Baneth, G., Apanaskevich, D.A., Mumcuoglu, K.Y. & Harrus, S. (2015) Molecular detection of *Rickettsia aeschlimannii* in *Hyalomma* spp. ticks from camels (*Camelus dromedarius*) in Nigeria, west Africa. *Medical and Veterinary Entomology*, 29(2), 205–209.
<https://doi.org/10.1111/mve.12094>
- Choubdar, N., Karimian, F., Koosha, M., Nejati, J. & Oshaghi, M.A. (2021) *Hyalomma* spp. ticks and associated *Anaplasma* spp. and *Ehrlichia* spp. on the Iran-Pakistan border. *Parasites & Vectors*, 14(1), 469.
<https://doi.org/10.1186/s13071-021-04956-3>