

Histopathological alteration in Heart and book lungs of species *Hotanta tamulus* from Malakoli region Nanded district (Maharashtra)

Dr. D. V. Jamkar

Arts, Commerce and Science College
Shankarnagar. Tq. Biloli Dist. Nanded

Dr. Rathod G. B.

S. S. Jr. College Shankarnagar.
Pin – 431505 (MH) INDIA.

Received: Feb. 02, 2018

Accepted: March 12, 2018

ABSTRACT

Scorpion follow fossorial mode of life for managing adoptive character. So it is very difficulties in operation during summer. In some invertebrate animal histopathological study throughout to year is difficult due to non-availability of animal. So it is need to study what changes are occurs while summer why death rate is more in summer is try to study by using histological study of more than 200 animal and found conclusion.

Keywords: acclimated, anaesthetized. Hematozylene, Hypertrophy etc.

Introduction:

Live scorpion specimens were studied with respect to various criteria like morphology, anatomy, histology, etc. Histology is an important branch of biology which deals with study of cells and tissue. It helps determining the action of toxicants or pollutants on the body tissue of organism and their adverse effects. Histopathology deals with the study of pathological changes induced in the microscopic structure of body tissue. Any particular alteration of cell may indicate the presence of disease or the effect of toxic substances. In scorpion it is observed that external organs are affected due to toxic chemicals causing erratic, movement loss of equilibrium increased fungal infection and lesions on head and cephalothorax finally leading to death. Due to fungal infection whitish mass is deposited over body surface. It may disturb bodily functions and cause death. It may be attributed to significant damage caused to the internal organs such as liver, muscle; heart, intestine, book lungs etc.

Thus, histopathological study gives useful data concerning changes in tissue prior to external manifestation. Numerous histopathological changes have been reported in scorpion exposed to a variety of pollutants.

Toxicants impair the metabolic & physiological activities of the organism. Physiological study alone does not give a complete understanding of pathological condition of tissue under toxic stress. Hence, present investigation was undertaken with a view to study the histopathological changes in vital tissue.

Material & Method:

A laboratory acclimated animal was anaesthetized and used for all the primary observations and kept in a dissecting tray having dorsal surface upwards. Freshly collected healthy animals were selected for histopathological study. They were dissected and tissue like Integument, hepatopancreas, book lung, heart, intestine, testis, and poison gland separated from animal immediately.

The tissues were fixed in aqueous Bouin's fluid for 24 hours and then processed through graded series of alcohol, cleared in xylene and embedded in paraffin wax. Sections of 6 μ thickness were cut and stained with Hematoxyline and Eosin and later on screened and photographed by micro photography.

A) Histopathological procedure before block preparation.

Wash the tissue in bouins fluid in 24 hours and lithium carbonate washing for two minute then washed in different grades of alcohol like 30%,50%,70%,90% and 100% for 24 hours each.

B) Procedure after block preparation (double staining procedure)

Fix the material on slide with fresh egg albumin, wash in tap water for two minute and stain in hematozylene for two minute. Destain the slide in acid water and wash in tap water each for 2 minutes. Dehydration is made in 30, 50, 70 % alcohol for 5- 10 minutes each and stain in eosin for two minute.

Further dehydration is carried out in 90 and 100 % of alcohol each for 5 - 10 minutes. Clear the slide in xylol or clove oil for 1-2 minutes and mount in DPX immediately.

The slides are dried and washed with xylene and cleared. The clear slides are screened and photographed by microphotography.

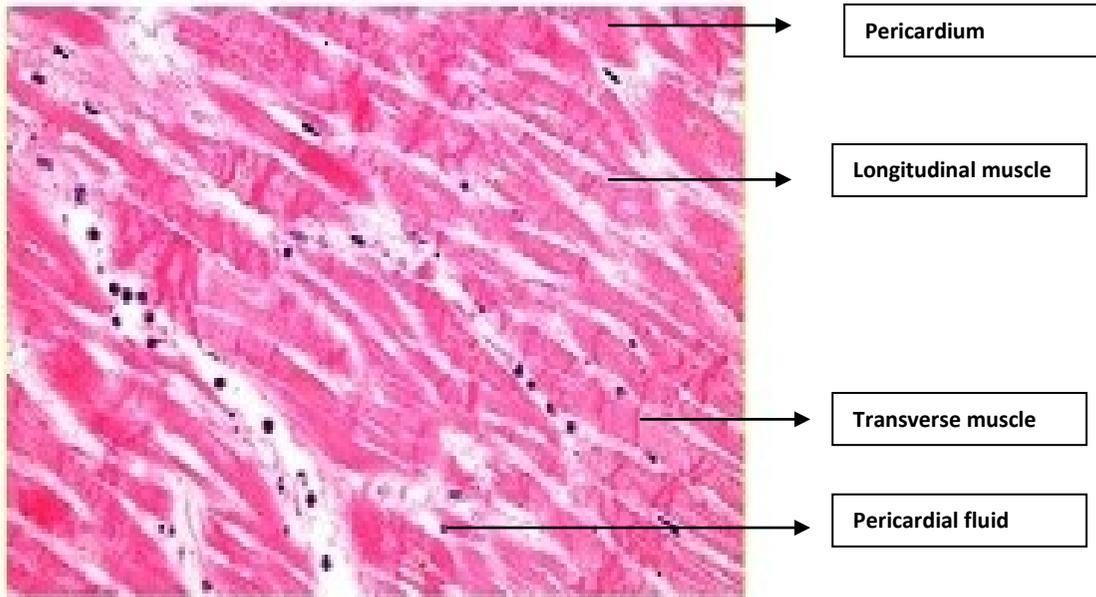


Fig. No. 1 Histology of Heart

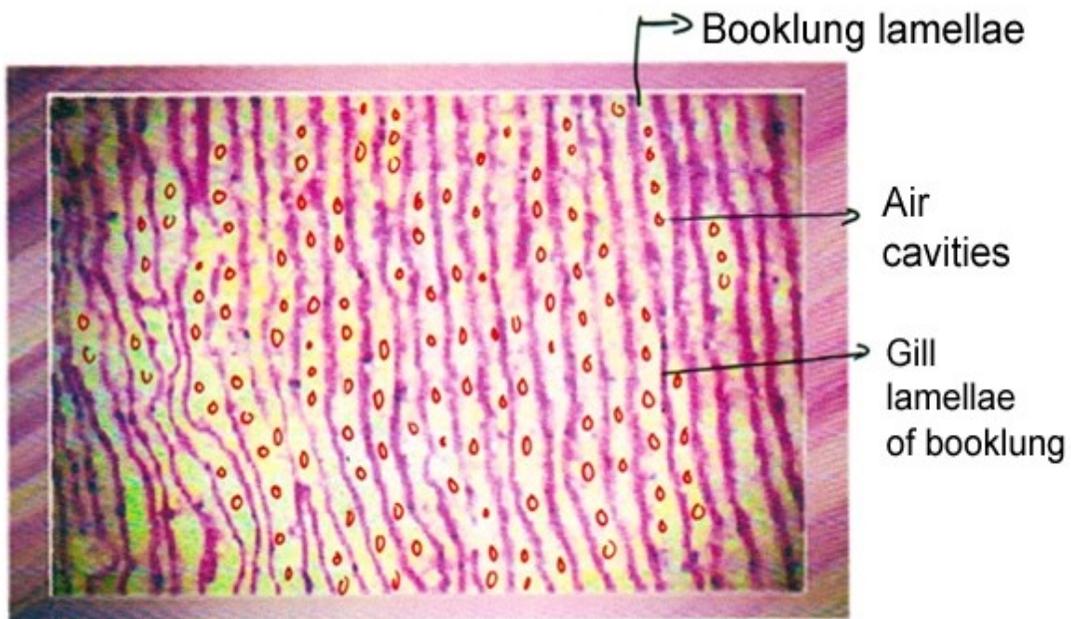


Fig no 2 Histology of booklung.

Observation and results:**Heart:**

Fig. 1 shows heart covered by a protective layer called the pericardium. Inner to pericardium, there are two types of muscular layers outer longitudinal muscle fiber and inner transverse muscle fibers. In cavities of muscle fiber, pericardial fluid with cytoplasmic granules is present. The pericardial fluid protects the heart from shock. There is no alteration in histological structure of heart in different seasons.

Book Lungs:

Book lungs are the respiratory organs in scorpion. It is necessary to study internal structure of scorpion in natural and artificial medium. Histological structure of book lungs is shown as follows.

Fig. 2 shows book lungs consisting of proximal part which is air atrium and distal part containing large cavity of folds on lamellae known as pulmonary chamber. Slit of stigmata is transverse. Pulmonary chamber consists of 150 lamellae attached to posterior medial side of chamber basal axis. They are arranged one over the other like leaves of a book. Each lamella is covered by cuticle which is thickened at places to form reticular network. From outer surface arise small denticulate bristles which are arranged obliquely over it. The lamellae are hollow through which blood flows. Longitudinal section of lamellae of book lung is formed by thin epithelium. The free end is thickened due to glandular cells. A secretion of the lamellar cells helps air passing through the air space of lamellae and thus facilitates exchange of gases.

Discussion**Heart:**

Heart is covered by a protective layer called pericardium. Inner to pericardium there are two types of muscular layers. These are outer longitudinal muscle fiber and inner transverse muscle fiber. In cavities of muscle fiber is a pericardial fluid with cytoplasmic granules. Internal structure of heart wall was studied by Hawk P. B., Oser B.L and W. H. Summerson (1965); McCann and Miller P (1969); Warburg M.R and Rosenberg M (2001), in different arachnoids. In pericardial fluid small microorganism was observed in polluted areas in summer as a result death was more recorded and necrosis of pericardial membrane is also occurring in *Buthus mardochei*, *Buthus occitanus*. Zwicky K. T. and S. M. Hodgson (1965), observed that heart of scorpion is myogenic.

Book Lung:

Book lung of scorpion *Hotanta tamulus* is damaged during summer due to increase in temperature. Temmink H et.al. (2006), showed hyperplasia of book lung epithelium induced in young ones of *Heterometrus fulvipes*. Gardner G.R and Yevich P. P. (1970), noted pathological changes in book lungs, necrosis in scorpion leading to death. In the present study, significance of observed changes related to the type of damage and the amount of book lung surface affected, damage to book lung can cause extreme respiratory distress by inhibiting oxygen transfer from environment to blood stream. The effect of damage to lamellae is observed which reduces oxygenated blood supply to organisms. The blood congestion observed in experiments may lead to anemia which is responsible for reduced haemocyanin. Hypertrophy can occur from an increase in functional demand which may be hormonal in origin. In present investigation hypertrophy of lamellar epithelium was observed. Wobeser G (1975), observed necrosis in book lungs.

References:

1. **AbdelGhanil.M; El-Asmer** (2009), Histological and immunohistochemical studies on the effects of the venom of the black-neck spitting cobra *Najanigracollis* snake. Biology, Nature 170:209.
2. **Anderson J.M and Ewen C.J (1973)**. Microanatomy of the integument and associated structure of two scorpions, *Centruroidessculpturatus*Ewing and *Uroctonusmordax*Thorell. Journal of Morphology, 119 (2): 161-180.
3. **Anees M. A.** (1996), Electron microscopical alteration among histology and itsl observation, BiochemPharmaco 6, 693-696.
4. **Babin D. R., Watt D. D. (1974)**,Microscopic anatomy of invertebrates (ChelicerateArthropoda). 8A. (F.W. Harrison & R.F. Foelix eds.), Wiley-Liss, NY. Pp. 117-222.
5. **Chaubey M.K. and Upadhyay R.K.** (2008), Biochemical, histological and enzymatic and morphological changes after black scorpion *Heterometrusfastigiosus*, Couzijn envenomation in experimental albino mice. Journals of Appl. Toxicol., 28: 874-884.

6. **Chakrabarthy D. K.** (1969), Ultrastructure of the integument of the scorpion (*Centruroidessculpturatus*) (Ewing), J. Morph. 137(3) : 365-384.
7. **Despande S. B, Pandey. R and Tiwari A. K.**, (2008). Pathological approach to the management of scorpion envenomation. Indian journals Physiology, Pharmacology. Vol 5, 311-314.
8. **Farley R. D.** (2001), Development of segmentation and appendages in embryo of the desert scorpion *Paruroctomus mesaensis* (scorpions: Vaejovidae). J. Morphol., 250(1): 70-88.
9. **Farrer J. E. and Shull.** (1999), Scorpion antivenom effect of micro scopical anatomy. Pharmaceutical Biology, 48 (8) : 891-896.
10. **Gardner G. R and P. P. Yevich.** (1970) "Histological and hematological response of estuarine animal". Journals of Arachnol. 7 (3): 223-230.
11. **Gutierrez M.** (1998), Histopathological study in American Journals cardiol, 19:719.
12. **Shastri K.V and Gupta P. K.** (1978), "The Histopathological structure of visceral organ. J. Natural Sciences. 10:399.