

**Corncrake *crex crex***

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## **Anatomical, Histological Study Eye of the Bird Corncrake *crex crex***

**Ali A. Abd**                      **Sanabil A. Abd Al Majeed**

*Department of Biology*

*College of Education*

*Mosul University*

### **ABSTRACT**

The present study carried out to investigate the anatomical and histological structure of eye components in the Corncrake *crex crex* which it is omnivorous to correlate the eye structure with nutrition nature.

The results showed, anatomically, that the eye ball spherical and compressed some thing at the anterioposterior axis, on the other hand the posterior segment larger than the anterior segment the eyes set on the side of the head top. The eye ball composed of three tunics: Outer sclera and it is extension cornea, middle uvea (choroid, ciliary body and iris ) and inner retinal layer.

Histologically cartilages surround the eye ball as well as Os nervi optici present near the optic nerve. The cornea concaved and differ in its thickness. The stroma of cornea appeared as three subdivisions layer differ in their density. Pigmented cells appeared at the root of the cornea. The lens some what flattened at the anterior and spherical at the posterior portion. The annular pad appeared at both side of equatorial.

The choroids had lymphatic vessels and the other components resemble that of other vertebrates. The iris showed variations in the thickness and skeletal muscles appeared in it. The Ciliary body very obvious and concave, at the central region, to ward the vitreous humour.

The retina appeared avascular and duplex (with rods and cones). On the other hand the dorsal and central portion of the retina more thicker than that of ventral and peripheral respectively. One dorso temporal fovea also appeared, and visual streak upper to the fovea.

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The pigment epithelial layer cells cuboidal. There were one type of rods and two types of cones (double and single) in the retina which differ in their density. Other structures were observed such as oil droplets in the cones and paraboloid in both rods and cones, The other layers of the retina resemble that other birds but their thickness differ at various portions of the eye ball.

The pecten oculi appeared as fan like vascular structure with 12 folds which originate from optic disc area processes extended from transverse pigmented bridge and then one process folded lateraly as well as upper bridge was noted.

We can conclude that the *Crex crex* bird have avery well acute vision because the cornea covexed and the lens flatted anteriory. On the other hand the retina contain temporal fovea, visual streak, oil droplets, Paraboloid, Pecten oculi, these structures enable the bird to see it is various nutrients in the environment easly.

**Keywords:** Corncrake *crex crex*, , Eye, Bird.

.( Lopez-Lopez *et al.*, 2008; Jones *et al.*, 2007)

.(Gunturkun, 2000)

(Pesek,1999)

.(Bayon *et al.*,2007)

. Scleral ossicle

Jones *et al.*, 2007; Murphy and )

.(Dupibielzig, 1993

18-10

Os nervi optici

( )

( )

.(Jones *et al.*, 2007)

( )

.(De\_stefano and Mugnaini, 1997)

.(Zhao *et al.*, 2002)

.(Samulson, 1991; Oliphant, 1988)

Annular pad

.(Jones *et al.*, 2007 ; Hods *et al.*, 1991; Samulson, 1991)

.( )

(Lopez-Lopez *et al.* , 2008; Frentiu and Briscoe, 2008)

.(Jones *et al.*, 2007)

Afoveate

Fovea

.....

Area centrales

Visual streak

Monofoveate

Difoveate

Pecten oculi

Cone

Pleated fan

.Bridgeless

Pleated

Jones *et al.*, 2007; )

.(Bayon *et al.*, 2007; Scala *et al.*, 2002; Kiama *et al.*, 1998

Omnivorous

Insectivorous

Granivorous

Frugvorus

.(Craiy and Hulley, 2004) Nectari vorous

Corncrake *crex crex*

Omnivourous

Green 1961 ) .

( *et al.*,1997

)

(

(%10) Neutral buffer formalin

48-24

. %100 -90-70

Oven

° 58

Paraffin wax

Rotary microtome

5-4

.( 2010 2008 )

( )

(Galigher and Kozloff, 1971) Azan

(Humason, 1979)

(Pears, 1985) The Periodic acid Schiff Technique (PAS)

.DPX

MDCE-5A

.(2007)

.(1 )

. (Bayon *et al.*, 2007; Conavese *et al.* , 1994)

.....

( ) .(2010 ; 1999 )

Sclera

( ) Uvea

Retina

.(Baumel *et al.*,1993)

**Sclera**

.( )

(3•2 )

.(4 )

; Lannce, 2003; Ronald, 1972)

.(2008 ;1997

Os nervi optici

(2 )

.(5•4•3 )

)

(2 )

.(5•4•3

(2010 )

(Jones *et al.*, 2007; Murphy and Dupibielzig , 1993)

.(Jones *et al.*, 2007)

**Cornea**

.(6 )

( )

(7 )

(Bayon *et al.*, 2007 ; Jones *et al.*, 2007)

.( 2010 )

.(Gunturkun, 2000; Kern, 1997; King and Mclelland, 1984)

.(7 )

.(9.8 )

7

)

(9.8

.(9.8 )

.(Samulson, 1991)

Jones *et al.*, 2007; Murphy and Dupibielzig, 1998 )

%25

.(1993;

(2010 )

.(Pigato *et al.*, 2008; Murphy and Dupibielzig , 1993; Samulson, 1991)



.....

**Lens**

Anuular pad

.(11,10 )

( Jones *et al.*, 2007 ; Bayon *et al.*, 2007; Samulson, 1991;2010 ; 1998 )

**Uvea**

.( )

**Iris**

(13 )

(12 )

(14 )

**Irdophores**

.(13 )

.(Bayon *et al.* , 2007; Williams, 1994)

Iridocytes

.(Jones *et al.*, 2007)

**Ciliary body**

.(15·6 )

.(16 )

(6 )

.(17 )

.(Jones *et al.*, 2007; Bayon *et al.*, 2007)

.(Murphy and Dupibielzig, 1993)

(Bayon *et al.*, 2007)

.(Zhao *et al.*, 2002)

**Choroid**

(18 )

(19 )

)

Vascularization

.(20·2 )

( 2010

.(Bayon *et al.*, 2007)

.(De\_Stefano and Mugnaini, 1997)

Bayon *et al.*, )

.....

.(2007; Korte *et al.*, 1989

.(2010 ) (De\_Stefano and Mugnaini, 1997)

**Retina**

.(21,19 )

.(23,22 )

.(Collin, 1997; 2010 )

.(Cserhati *et al.*, 1989; 2010 ; 1998 )

.(24 )

)

.(25

.(Ross, 2003)

(Ross, 2003; Zeffran *et al.* ,1990 ) ( Steenstrup and Munk, 1980 ; 2008 )

.(1998 )

<sup>2</sup> /1000000

.( Wolpert, 2002; Zeffran *et al.*,1990 )

.(Jones *et al.*, 2007)

(Ross, 2003) ( 2008 )

Bayon *et* ; Jones *et al.*, 2007; Ross, 2003)

.(*al.*,2007

.(Bayon *et al.*, 2007)

(26,21,19 )

Parabloid

(PAS )

(26,25,23,22 )

(Jones *et al.*, 2007)

(Braekevelt, 1993)

(Braekevelt, 1995 )

(Braekevelt, 1988)

a,b )

A

(Braekevelt, 1994

)

(Braekevelt ,1994 c )

)

(

(

Samulson, 1991 1984)

(;Young and Martin,

(Jones *et al.*,2007)

( 2010 )

( )

(Husband and Shimizu, 2001)

(Frentiu and Briscoe., 2008; Hart and Vorobyev, 2005; Cserhati *et al.*, 1989)

Cserhati *et* )

(*al.*,1989

.....

.(26,25,19 ) PAS

.(2010 ) (1998 )

(22 )

(25 )

.(Rodieck, 1973)

(23,22 )

.(22 )

1998 )

.(Cohen, 1972;

(22 ) 16

.(23 ) 10

(25 ) 20

PAS

; 1997 )

.( 2010 ; 2008 ; 1998

(25,22,21 )

(Marc,1998)

.(Marc, 1998)

.(Collin,1997)

(25 )

4

.(26,23 )

PAS

-

(Marc, 1998 ;Collin, 1997 ;Rodieck, 1973 ; 2010 )

) (25,22,21,19 )  
) (21,19  
(

(27,2 )  
(

( Bayon *et al.*, 2007 ;2008 )

2010 ; 2008 )

(Jones *et al.*, 2007 ; Marc, 1998;

)  
) (27

12 ( (28,27 )

PAS

(30,29 )

(30,28 )

Pericytes

(30,29 )

( )

.....

.(Brach, 1977)

Murphy and )

. (Dupibielzig, 1993

.(Bayon *et al.*, 2007)

.(Jones *et al.*, 2007)

10

18-17

; Braekevelt,1991 ;2010 ) 20

10-8

( )

.(Smith *et al.*, 1996; Braekevelt,1993

.(Jones *et al.*, 2007)

.( Bayon *et al.*,2007;Jones *et al.*, 2007;Scala *et al.*,2002 )

.(Brach, 1977)

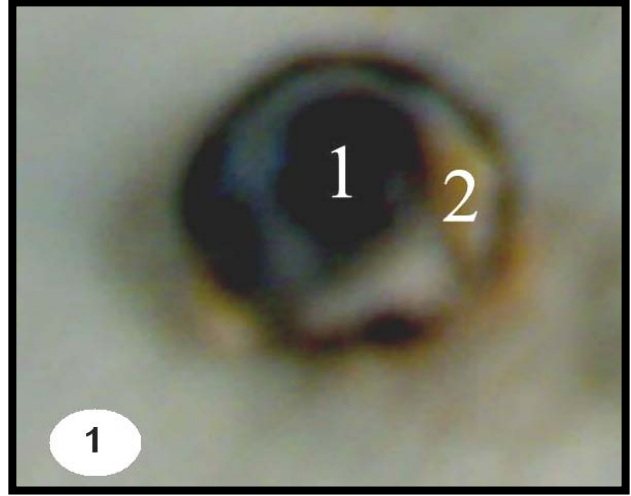


Figure 2: Low-magnification histological section of a tissue structure, possibly a blood vessel or duct, stained with H&E. The structure is U-shaped and shows various layers. Labels 1 through 7 point to different regions. A scale bar of 40µm is visible in the bottom right corner.

Figure 1: High-magnification view of a circular structure, likely a cross-section of a vessel or duct. Labels 1 and 2 point to the central and peripheral regions respectively. A scale bar of 10µm is visible in the bottom left corner.

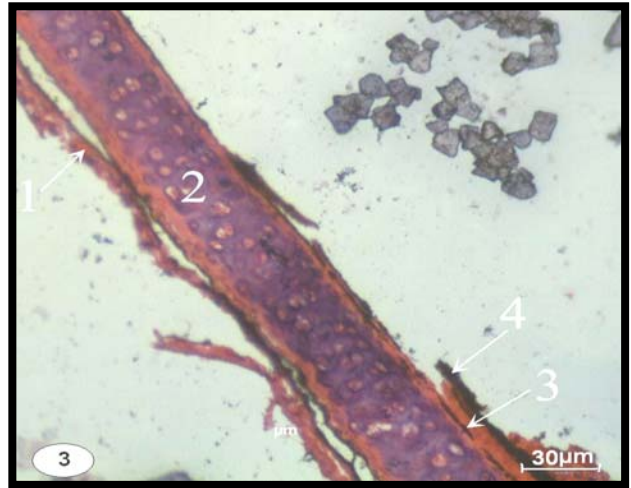


Figure 4: High-magnification histological section of a curved tissue structure, stained with H&E. Labels 1, 2, and 3 point to different layers. A scale bar of 30µm is visible in the bottom right corner.

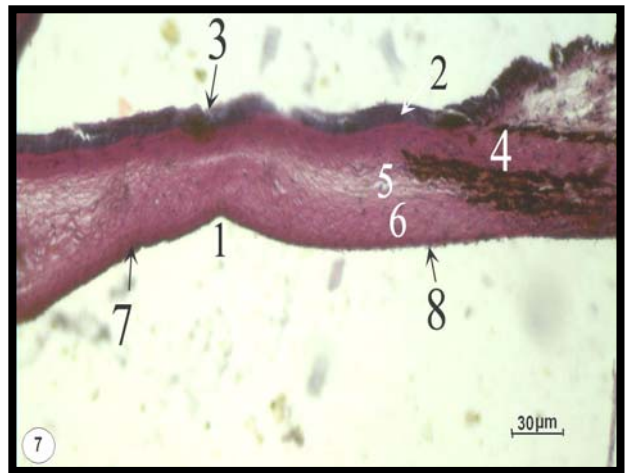
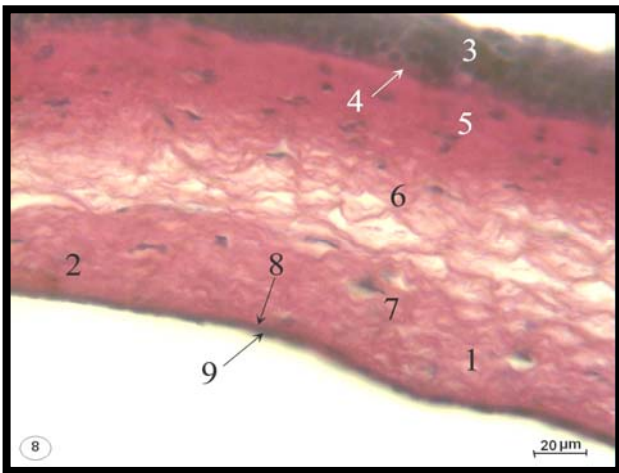
Figure 3: High-magnification histological section of a curved tissue structure, stained with H&E. Labels 1, 2, 3, and 4 point to different layers. A scale bar of 30µm is visible in the bottom right corner.



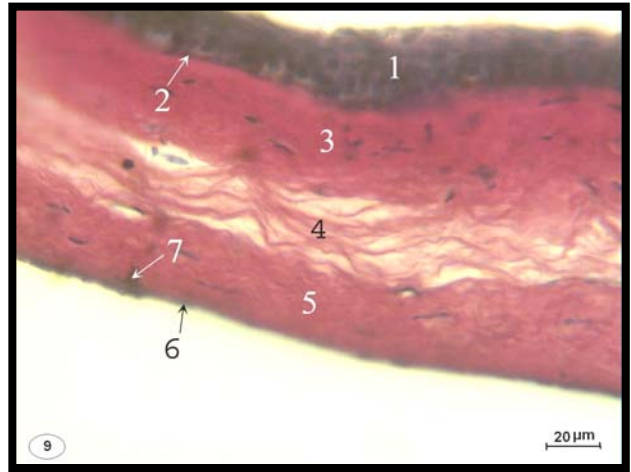
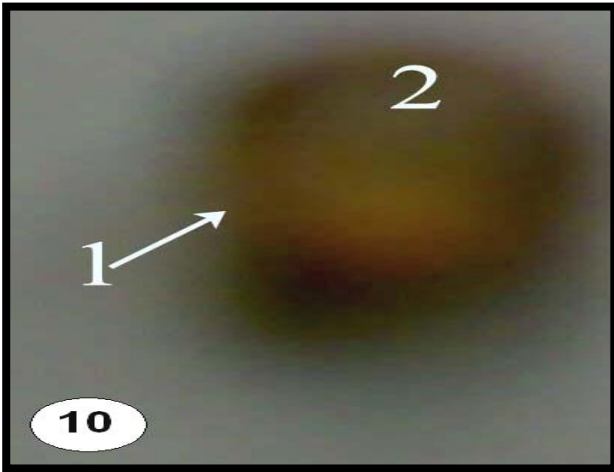
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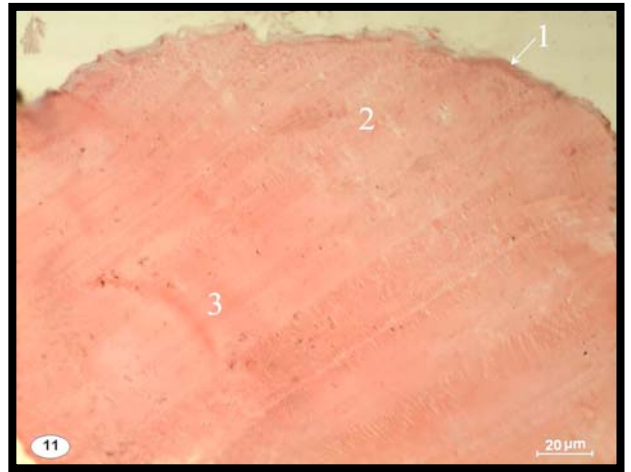
:2 :1 :5  
 .(H&E ) . :3  
 :3 :2 :1 :6  
 .( H&E ) . :4



:3 :2 :1 :7  
 .(H&E ) . :8 :7 :6·5·4  
 :3 :2·1 :8  
 .(H&E ) . :9 :8 :7·6·5 :4

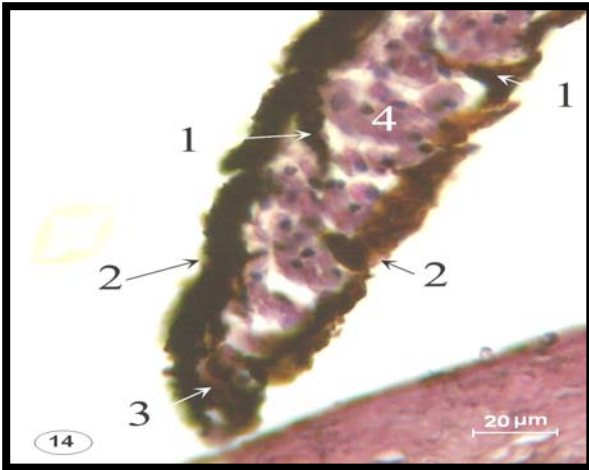


10 :2 :1 :9  
 .(H&E ) . :7 :6 :5,4,3 :10  
 . :2 :1



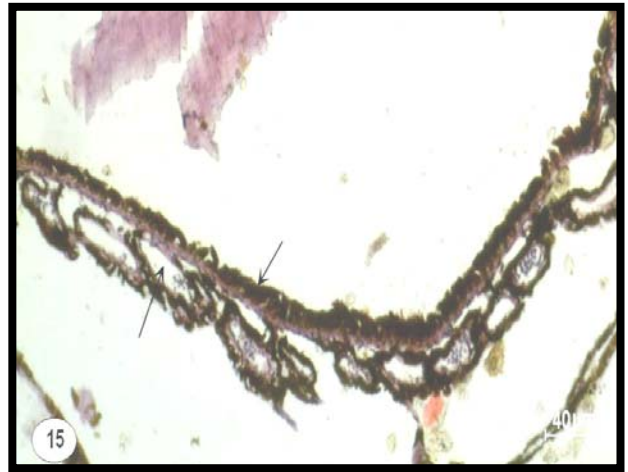
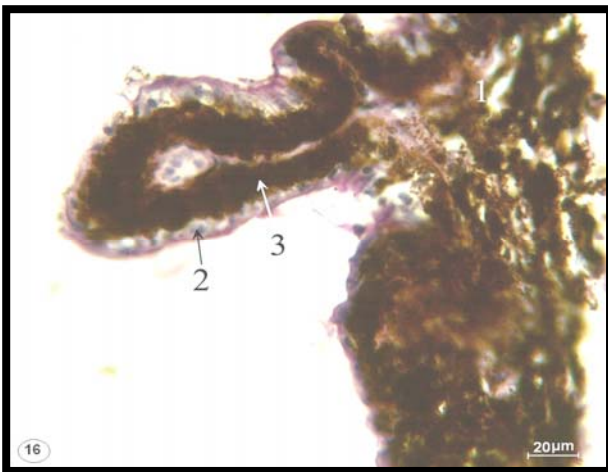
12 :3 :2 :11  
 .(H&E ) . :12  
 :1 :3 :2 :4  
 .(PAS ) .

.....



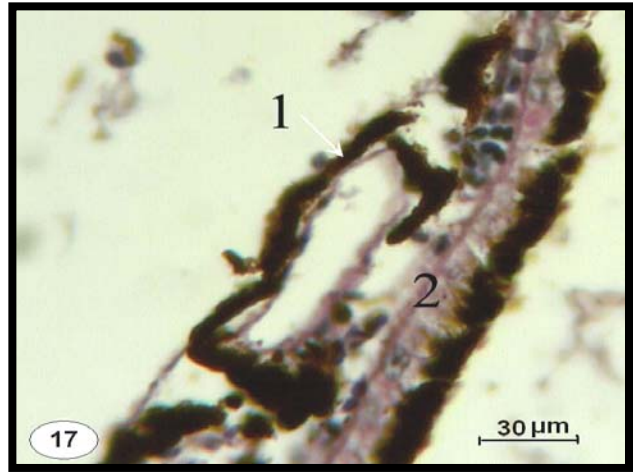
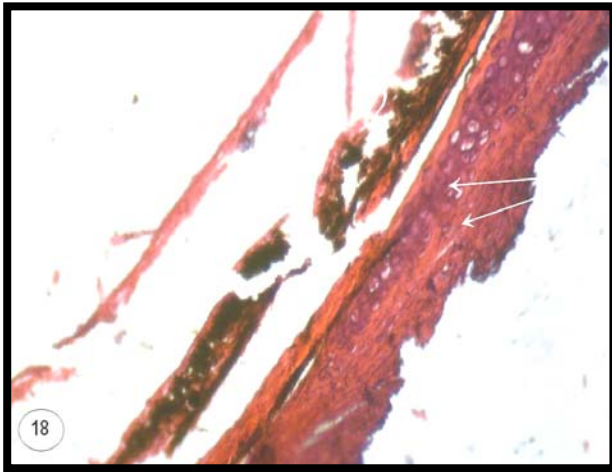
:1  
 .(PAS ) . :3  
 :1  
 :3 :2  
 .(PAS ) . :4

: 13  
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 : 14

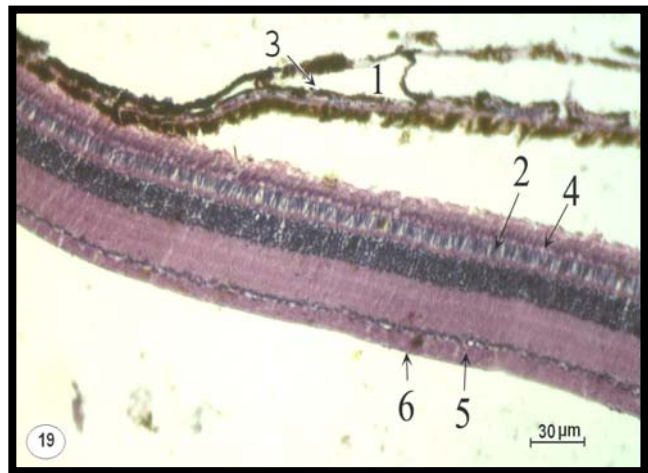
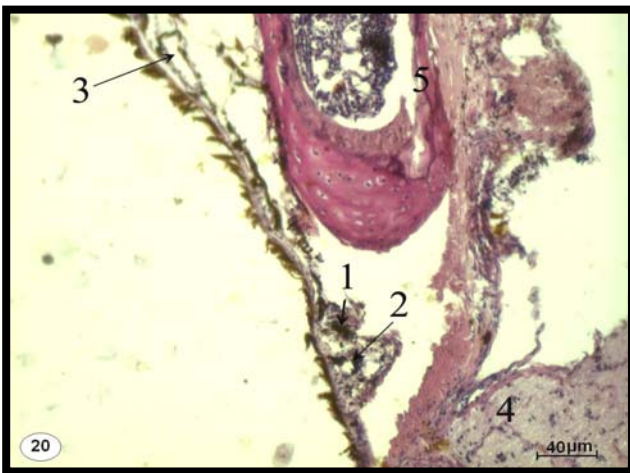


:2 :1  
 :3 :2 :1  
 .(H&E ) . :16

: 15  
 .(H&E ) .  
 : 16  
 .(H&E ) .

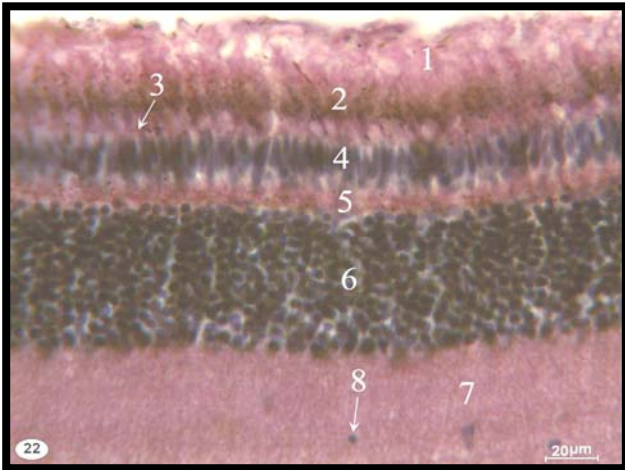


17 : 1 : 2 : (H&E) .  
 18 : 1 : 2 : (H&E) .

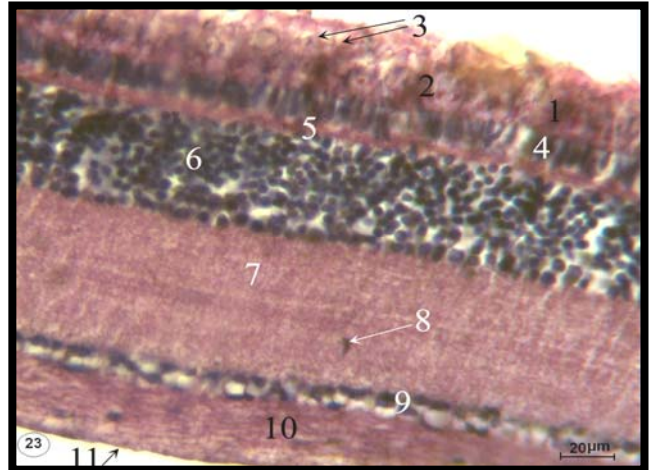
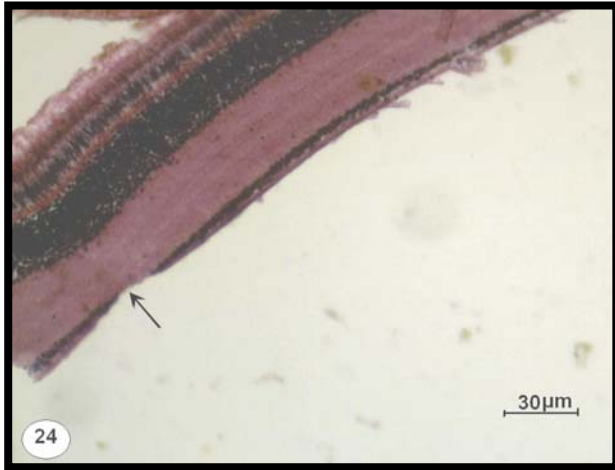


19 : 1 : 2 : 3 : 4 : 5 : 6 : (PAS) .  
 20 : 1 : 2 : 3 : 4 : 5 : (H&E) .

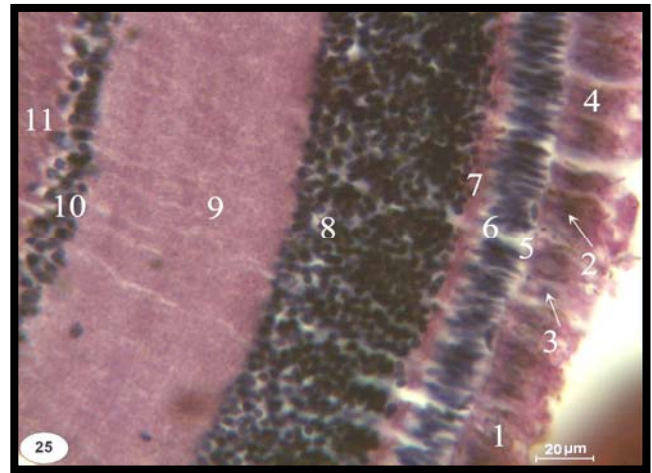
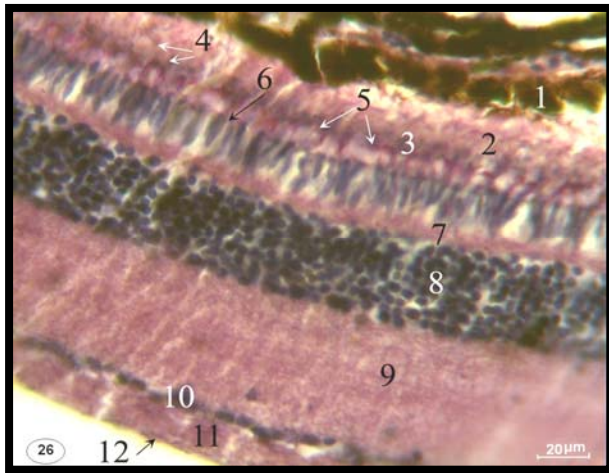
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:1 : 21  
 ) . : 4 :3 :2 : (AZAN  
 :3 :2 :1 : 22  
 :6 :5 :4 :  
 .(PAS ) . :8 :7



:1 : 23  
 :5 :4 :3 :2  
 :10 :9 :8 :7 :6  
 .(PAS ) . :11  
 .(H&E ) .( ↑ ) : 24



: 25

:3 :2 :1

:6 :5 :4

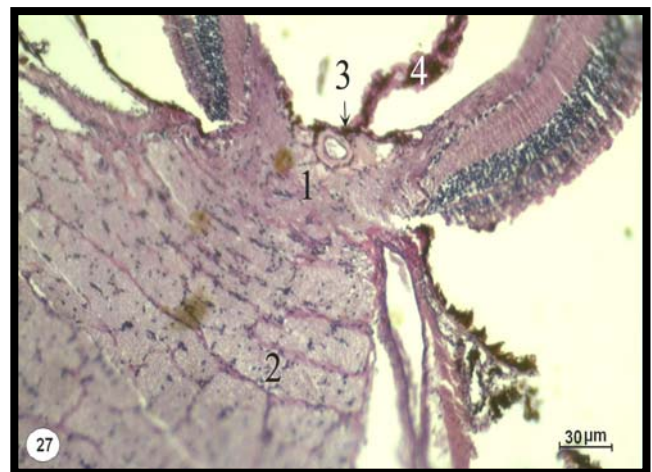
.(PAS ) . :11 :7

:2 :1 :26

:7 :6 :5 :4 :3

:11 :10 :9 :8

.(PAS ) . :12



: 27

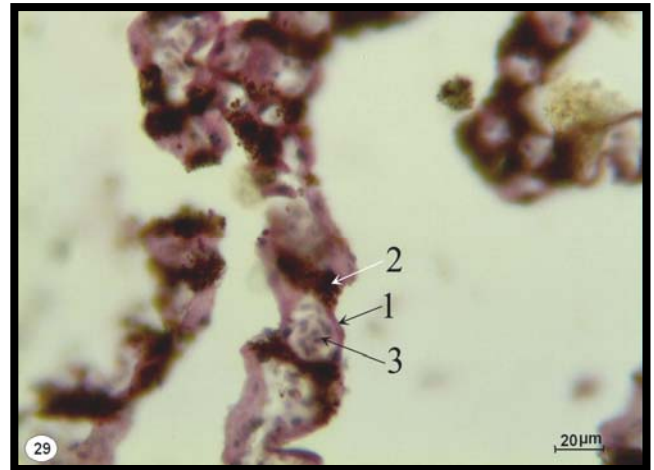
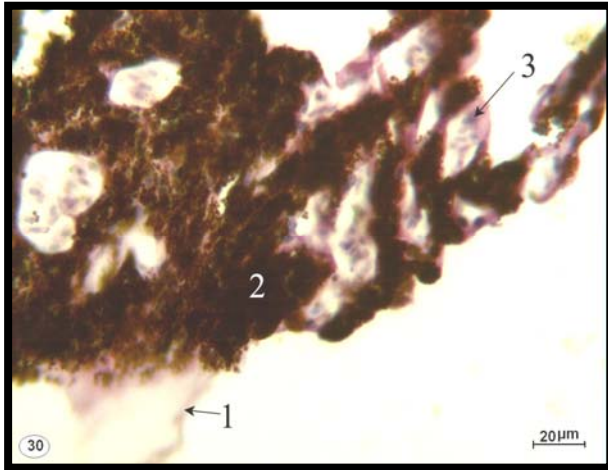
( ) :1  
.(PAS ) . :4

:3 :2

:3 :2 :1 :28

.(PAS ) .

.....



:3 :2 :1 : 29  
 . (PAS )  
 :1 ( ) : 30  
 .(PAS ) :3 ( ) :2

-  
 Arthropoda ) *Potamon magnum magnum*

.(2007)

.(Pretzman) (:Crustacea :Decapoda  
 .(2008)

.(1999)

*Melagri glibaro*

.(2010)

*Pterocles alchata caudarus*

.( )  
 .193-186

.(1961)

.(1997)

*Ranna ridibunda ridibunda* Pallas

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