Seasonal changes in the Thymus gland of Tilapia Nilotica Fis

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Abstract
This study was carried out on 100 thymus gland of apparent healthy Tilapia fish. The thymus was situated on the superior edge of the gill cover clos opercular cavity; the thymus was surrounded by connective tissue capsul consisted of collagen fibers and reticular fibers. The thymocytes (T- lymphocyt the main type of cells present in thymus embedded within network of epithelial cells. The thymus was characterized by presence of hassall's body-like str myoid cells, mucin secreting cells and melanomacrophage cells. The thymus great involution in winter in form of decrease number of lymphocytes, prolifer connective tissue and adipose tissue. Thymus showed regeneration of tissue spring. Sharp increase in lymphocytes number was observed during summe lymphocytic foci became denser and increased in size . In autumn the pare was divided into cortico-medullary like zones with increase in connective proliferation especially in the medulla. The lymphocytic foci become less der decreased in size.

Introduction
Oreochromis niloticus is probably the most important of the Tilapia species. (A Adepo-Gourence, Abban and Fermon, 1997). Because of it's rapid growth, lar good taste and its economical price (Bakr, 2002). In teleost fishes, the immune consist of the spleen, pronephros and thymus. (Zwollo Cole, Bromage and K 2005). Some researchers believe that photoperiod and temperature are both principle seasonal cues in aquatic animals (Bromage, Porter and Randall, 200 clear that the environment affects the immune system of fishes. If sea associated changes can be anticipated, it may be possible to bolster the i system at times when they are known to be immunosuppressed, as under photoperiod regimns, with the application of immunomodulators su immunostimulants prior to exposure to stressful events. Ultimately, understand seasonal effects on the immune function of fish may provide a better understar epidemiology of specific fish pathogens, Bowden Thompson, Morgan, Gratac Nikoskelainen (2007). The aim of this study to show the influence of seasonal c on the thymus gland as one of the immune organs.

Materials and Methods
Hundred apparent healthy Tilapia nilotica fish (oreochromis niloticus) of both were collected from different fish farms in El-Kanater el-khaieria. The thymus were collected and put in Susa and Bouin's fixatives then dehydrated, cleared, e and cut at 4-5 microns. The tissues stained with general and special stained ac to the methods given by Bancroft and Cook (1994). For TEM, 1mm^3 sample used. Samples were fixed in 2.5% glutaraldehyde in 0.1 M sodium cacodylate and postfixated for 2 h in 1% osmium tetroxide buffered to pH 7.4 at 4°(fragments were dehydrated in a graded series of ethyl alcohol and embedded in resin embedding medium to produce medium hardness blocks prior to sect

Semithin sections 0.5 µm in thickness were used for histological observation a toluidine blue staining. The ultrathin sections were prepared with Ultracut microto stained with uranyl acetate and lead citrate (Chiu, Schmidt, and Prasad, 1993), examined by a Jeol JEM-100S transmission electron microscope (25KV) in nati cancer institute.

Results

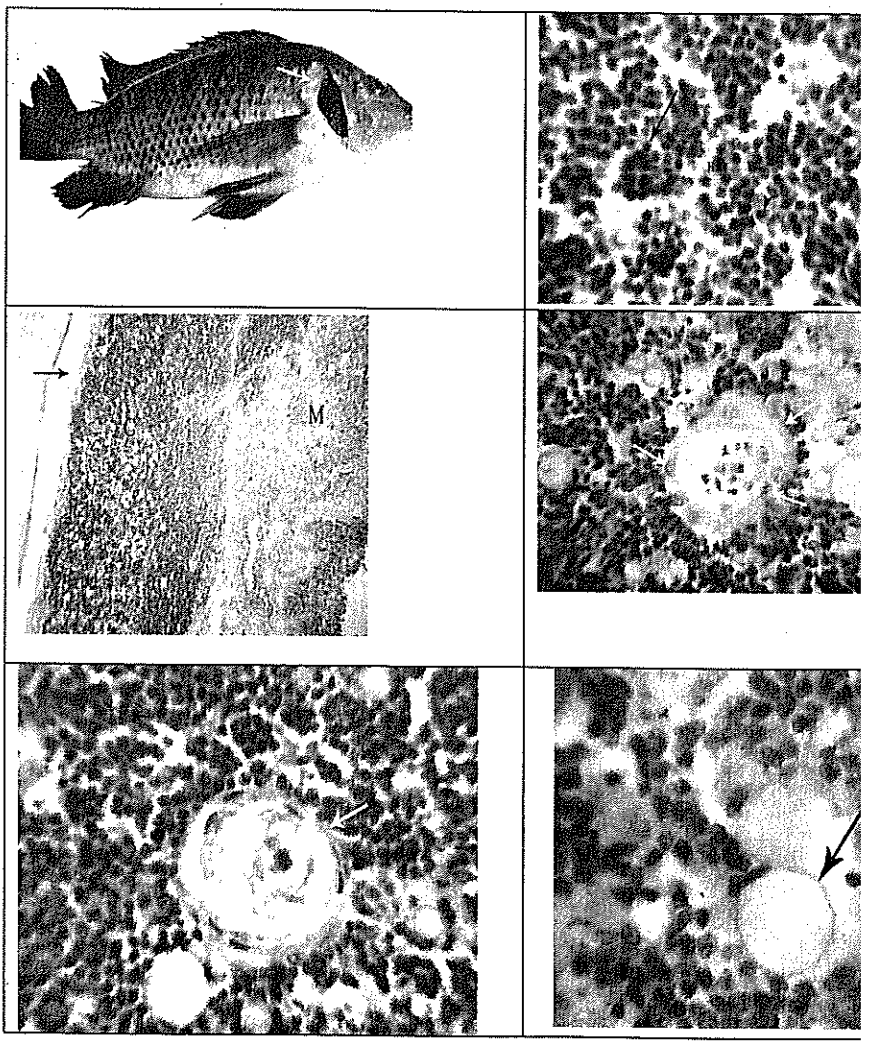
The thymus was bilobed organ and situated on the superior edge of the gill cover c to the opercular cavity in contact with the water current (Fig.1).The thymus gland consisted of darkly stained cortex and lightly stained medulla, and covered connective tissue capsule (Fig. 2), which formed from collagen fibers and retic fibers, from the capsule short trabeculae emerge into the parenchyma.

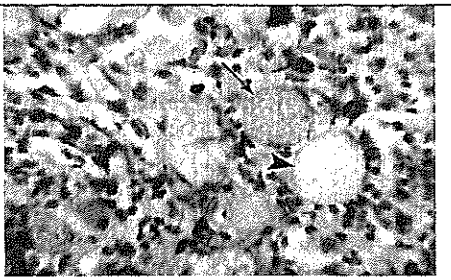
The thymus gland parenchyma was formed from thymocytes which were numer and arranged in two forms, small sized lymphocytes which mainly condensed in cortex with centrally located, darkly stained nucleus and lightly stained rin cytoplasm. Large sized lymphocytes were located in the medulla with darkly sta nucleus and faint eosinophilic cytoplasm. The lymphoblasts were located betweer thymocytes especially in the cortex (Fig. 3). Reticuloepithelial cells were loc between the thymocytes especially in the medulla. They were large cells with lig stained basophilic cytoplasm and oval to ovoid nuclei (Fig. 4). The reticular epith cells form Hassall's body-like structures which composed of concentrically arrar reticuloepithelial cells with degenerated center (Fig. 5). Another type reticuloepithelial cells was found in thymic parenchyma, which were large cells elongated periphery situated nucleus (Fig.6) and mucin filled cytoplasm w consisted of acid (simple, or non-sulfated) mucins typical of epithelial cells contai sialic acid which stained positively with PAS stain. Some epithelial cells showed reaction to PAS stain others not. The reaction varied according to amount of muci the cytoplasm of this cells (Fig.7), also the cytoplasm of this cells stained with a blue PH 0.1 (Fig. 8). The thymic medulla also consisted of another type of cells, w were large cells with acidophilc (fibrillar) cytoplasm and large spherical cen situated nucleus with prominent nucleolus which could be named myoid cells (Fig Melanomacrophage cell also found in thymus which was macrophage conta melanin granules. This macrophages appeared usually in solitary form (Fig Sometimes form clusters of group of melanin containing macrophages. The me granules may be few dispersed in cytoplasm or may fill it and even obscurec nucleus.

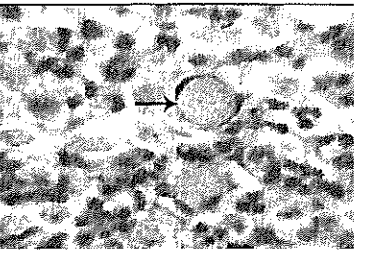
The thymus showed great involution in winter in form of decreased numbe lymphocytes and proliferation of connective tissue and adipose tissue so the size c thymus decreased as a whole. It was formed from three zones, inner and outer z consisted of thymocytes and reticuloepithelial cells while middle zone consiste adipocytes and collagen fibers (Fig. 11). The thymus showed regeneration of ti during spring season, the parenchyma divided into cortico-medullary like zones. lymphocytes number increased in comparison with winter with decrease in conne tissue, the lymphocytes was more condensed with numerous blood cells dispersed between the medullary cells while few cells escaped between the co cells (Fig. 12). The thymus increased in size in summer season and covere connective tissue capsule enclosing the parenchyma which divided into co medullary like zones (Fig.13). Sharp increase in lymphocyte number observed d this season as the cortex become denser and highly populated with thymoc

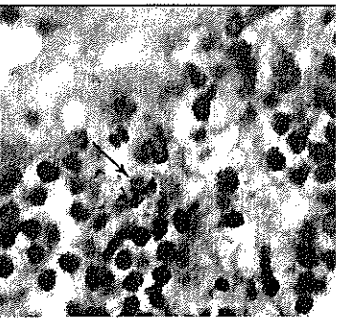
Decrease in lymphocytes number was observed during autumn seasor lymphocytic foci became less dense and decreased in size, with noticeable in myoid cells (Fig. 14).

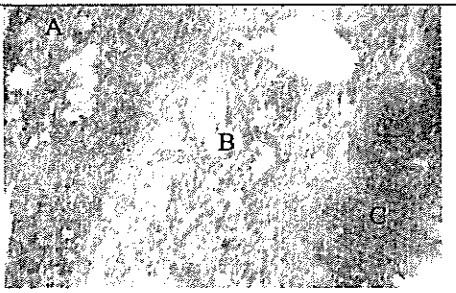
Legend of figures







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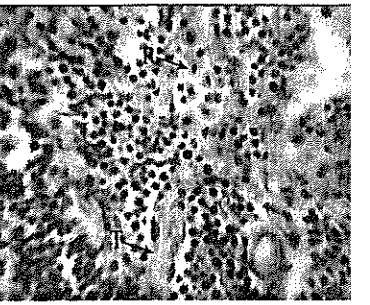

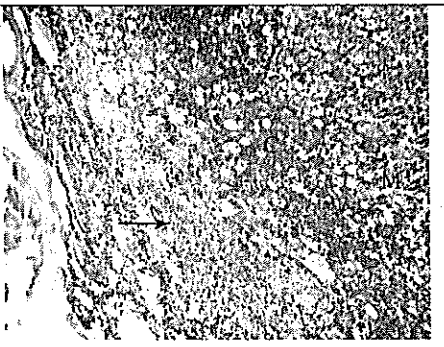

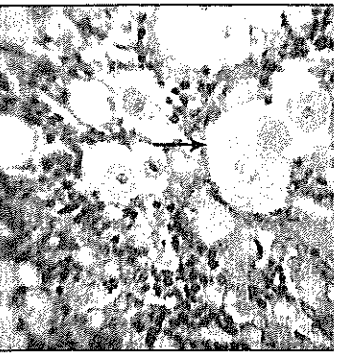

Fig.1: Tilapia nilotica fish showing the thymus gland (arrow) the thymus locate superior edge of the gill cover close to the opercular cavity.
Fig. 2: Section in the thymus showing connective tissue capsule (arrow) differentiating lymphoid cells (thymocytes) within a network of epithelial cells generally organized in dense cortical (C) and light medullary (M) like zone (X100).
Fig.3: Section in the thymus showing parenchyma of thymus which is comp small sized lymphocytes (arrow), large sized lymphocytes (head arro lymphoblast (b). H&E (X1000).
Fig.4: Section in the thymus showing reticulo-epithelial cells (arrows). H&E (X10
Fig.5: Section in the thymus showing Hassal's like corpuscle which compo concentrically arranged epithelial reticular cells with degenerated center (arrow (X1000).
Fig.6: Section in the thymus showing one of the epithelial reticular cell which wa and spherical in shape with elongated and periphery situated nucleus and muc cytoplasm (arrow). H&E (X1000).
Fig.7: Section in the thymus showing epithelial reticular cells containing mucins cells show high reaction to stain (arrow) others show negative reaction (head PAS stain (X 1000).
Fig.8: Section in the thymus showing thymic medulla which consisted of alcia epithelial reticular cells containing mucins (arrow). Alcian blue at pH 0.1 stain (X
Fig. 9: Section in the thymus showing myoid cell which is characterized b nucleus, prominent nucleolus and fibrillar cytoplasm (arrow). H&E (X1000).
Fig.10: Section in the thymus showing macrophage containing melanin g (arrow). H&E (X1000).
Fig.11: Section in the thymus during winter season showing three zones outer z and inner zone (C) consisted of lymphocytes and epithelial reticular cells and zone (B). H&E (X100).
Fig.12: Section in the thymus during spring showing presence of red blood c under capsule (C) which extend trabeculae (T) into the parenchyma. H&E (X40
Fig. 13: Section in the thymus during summer showing connective tissue envelope the parenchyma which composed of outer dense cortex (C) and inn medulla (M). H&E (X100).
Fig.14: Section in the thymus showing melanomacrophage center (arrow). Ma Fontana method with hematoxylin stain. (X1000).

Discussion

This study revealed that the thymus was surrounded by connective tissue c consisted of collagen fibers and reticular fibers sending short trabeculae i parenchyma dividing it into incomplete compartments. This was described a Hueza et al. (1995) in Brown trout.
The thymus was formed from an outer layer or cortex and an inner layer or r which can be distinguished, although the delineation between the cortex a medulla is indistinct. This result was similar to that detected by Press and E (1999) in teleost fish.

The cortex usually contained a higher density of thymocytes than the medu relatively few epithelial reticular cells. The medulla was less densely populate cells but the epithelial cells were more prominent and form supporting mes

These cell types were referred to as reticulocytes and the epitheliocytes. This re reported by Becker et al. (2001) in Carp and Petrie-Hanson and Peterman (2005 american paddlefish, The thymus in winter was formed from three zones, inner outer zones contained thymocytes and epithelial reticular cells while the middle z contained adipocytes and collagen fibers. This result indicated that during winter sc involution had occurred in thymus which means that a drop in immune response found during this season, this result agreed with Alvareza et al. (1998) in wild br trout, and Hueza et al. (1995) in Salmo trutta The thymus gland was compo generally from thymocytes (T- lymphocytes) which form the main type of cells pres in thymus embedded within network of epithelial reticular cells. Thymocytes wl were numerous and arranged in two forms, small sized lymphocytes which ma condensed in the cortex with centrally located, darkly stained nucleus and lig stained rim of cytoplasm. Large sized lymphocytes were located in the medulla darkly stained nucleus and faint eosinophilic cytoplasm. The lymphoblast were loc between the thymocytes especially in the cortex, this result is augmented with Mani (1994) in teleost fishes Corresponding with Romano et al. (1999) in Carp, this v revealed that the epithelial- reticular cells were large cells with lightly stained basop cytoplasm and oval to ovoid nuclei, they formed Hassall's body-like structures w composed of concentrically arranged epithelial reticular cells with degenerated cel Also the medulla of thymus contain mucin secreting cells (type of reticuloepith cells) which were large cells with elongated periphery situated nucleus and mucin f cytoplasm, this cells stained positively with PAS, alcian blue PH 0.1 and 2.5. result was found by Hussein (2007) in Oreochromis niloticus.

The thymus was characterized by the presence of large cells with acidophilc (fibr cytoplasm and large spherical centrally situated nucleus with prominent nucle which termed myoid cells this result was augmented by Fange and pulsford (198 teleost fish who found that myoid cells are noted in the teleostean thymus an thymocytes and epithelial cells and characterized by their large size, a clear cytopl and a large nucleus with a central prominent nucleolus. In agreement with Gorg (1983) in Cling fish , Heemstra and Randall (1993) in grouper, rockcod, hind, grouper and lyretail species, the present study revealed that melanomacrophage also was found in thymus which was macrophage containing melanin granules. Th macrophages were present usually in solitary form sometimes form centers from g of melanin containing macrophages. The melanin granules may be few disperse cytoplasm or may fill it and even obscure the nucleus Kendall (1991) in teleost and Romano et al. (1999) in Carp In agreement with Alvarez et al. (1994) in Rainbow trout the present work found that erythrocytes also observed in thymus its number change with season. It was few in winter and autumn but in spring thymic erythropoietic activities were increased which appeared in the form of incre number of erythrocytes inside thymic parenchyma especially under the capsule. S decrease in erythrocytes number was occurred in summer.

The thymus gland showed great involution in winter in form of proliferatio connective tissue and appearance of high number of adipocyte, this result indic that low temperature adversely affect immune organs in fish (piokilothermic anir this result is in agreement with Tamura et al. (1981) in viviparous surfperch and and Takemura (2003) in Tilapia niloticus.The thymus showed regeneration of t during spring, the lymphocyte number reached its maximum level during summer re decreased again during autumn, this result previously mentioned by Sharaf El- (1993) in Oreochromis niloticus.

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خص العربى

يرات الموسميه للغده الزعتريه في سمك البلطي النيلي

م فؤاد عطيه, ايهاب محمود الزغبي.مني نصر عبد النعيم. حاتم حسين بكري
الانسجه والخلايا وقسم الطب الشرعي- كليه الطب البيطري-جامعه بنها

ت هذه الدراسة علي الغدة الزعترية أثناء المواسم المختلفة لمعرفة تأثير الحرارة وفترة الإضاءة علي
عة.وقد أجريت هذه الدراسة علي مائة من سمك البلطي النيلي جمعت من مزارع مختلفة بالقناطر الخيرية
ظة القليوبية. وجدت الغدة الزعترية تحت الجزء العلوي من غشاء الخياشيم بجانب التجويف الفمي وكانت
مغطاة بطبقة طلائية ترسل تفرعات صغيرة إلي داخل النسيج البرنشيمي الذي يتكون من قشرة ونخاع
ة من مجموعة من الخلايا الليمفاوية داخل شبكة من الخلايا الطلائية.تتميز الغدة الزعترية بوجود تركيب
كرات هاسل وخلايا شبه عضلية وبعض الخلايا المفرزة لمادة لزجة (نوع من الخلايا الطلائية) والخلايا
ة الصبغية وكرات الدم الحمراء.الغدة الزعترية تضمحل في فصل الشتاء في صورة زيادة نسبة النسيج
مي والنسيج الدهني في الجزء الأوسط أما الجزء الداخلي والخارجي فيحتويان علي خلايا ليمفاوية داخل
من الخلايا الطلائية والشبكية.في فصل الربيع تستعيد الغدة الزعترية تكوينها من قشرة ونخاع مع زيادة
ظة في عدد كرات الدم الحمراء وخاصة تحت النسيج الطلائي الشبكي .في فصل الصيف وجدت زيادة
ظة في عدد الخلايا الليمفاوية والخلايا البالعة للميلانين وتكون في هيئة تجمعات بدلا من وجودها منفردة
في المواسم الأخرى.أما في فصل الخريف فقد وجد هناك نقص في عدد الخلايا الليمفاوية.