

Anatomical and Histochemical Studies of the thyroid gland of two Egyptian reptiles

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Abstract:

Two species of lizards are used in the present work *Eumeces schneiderii* as a hibernating reptile and *Laudakia stellio brachydactyla* as a non-hibernating one.

Macroscopically, the thyroid of *Eumeces schneiderii* is formed of separate paired structures lying on both sides of the bifurcation of left and right carotid arteries. The thyroid of *Laudakia*, is formed of two well defined lobes each lying on either side of the trachea with a narrow connecting isthmus.

Microscopically, the thyroid gland in both animals is composed of a big number of follicles which are held together by a loose connective tissue. The Interfollicular spaces are filled with blood sinusoids. Each follicle is composed of one layer of epithelial cells, which vary in their heights from winter to summer.

In *Laudakia*, the gland never become completely inactive during winter. In *Eumeces schneiderii* , it is completely inactive during hibernation.

Intracellular colloid droplets are rarely found in the thyroid of *Laudakia*, while they are very frequent In *Eumeces schneiderii*. This colloid shows regular seasonal changes in both animals depending on the degree of activity of acini.

Introduction:

Although reptiles *Eumeces schneiderii* and *Laudakia stellio brachydactyla* have been recorded in Egypt from long time (**Anderson, 1898**), there are little informations about the histological and histochemical structures of the endocrine glands of these species.

Several early anatomists reported about the presence of the thyroid tissue in few reptiles. Detailed description of the gross morphology of the thyroid is available for only a small number of reptiles; **Naccarati (1922)** on *Emys europaea* , **Pischinger (1937)** on *Chalcides*, and **Adams (1939)** on *Sphenodon* and *Lacerta* made a comparative presentation of the anatomical features of the endocrine gland in the neck region of reptiles and other vertebrates.

Viguer(1909a) described the presence of lymphoid tissue in variable places of the thyroid gland of the gecko *Tarentola mauretaniae*. He stated that this tissue is similar to the thymus of young lizard. Group of lymphocytes was also described by **Eggert (1934)** in the tropical gecko, *Gymnodactylus marmoratus* on the sides of the thyroid gland.

Eggert (1935) described the presence of aggregations of lymphocytes in the thyroid glands of *Lacerta agilis*; *Lacertavivipara* and *Lacertamuralis* in the interfollicular spaces next to the rest cells.

Bragdon (1952) in grater snake *Thamnophis sirtalis* indicated that, the gland is avoid or globular in shape located at the level of the twenty first to twenty fourth ventral scutum. The resultes of the

comprehensive work carried out by **Lynn and Walsh (1957)** in Lacertilia, **Gans and Lynn (1965)** and **Lynn (1970)** indicated that, the most common thyroid form in lizards with exception of *Amphisloaenia* is like that of mammals.

Viguiet (1909a,b & 1911) in *Tarentola mauretania* and *Uromastix acanthinurus* gave brief description of normal thyroid histology in several lizards. **Barchiesi (1928)** discussed the effects of prolonged starvation up on the turtle thyroid and pointed out the enormous variability in the thyroid histology of the normal turtle. **Bussi (1929)** ,described the reticular network around the thyroid follicles in several reptiles as well as in birds and amphibians.

The effects of diverse stress on thyroid activity in soft – shelled turtles, *Lissemys punctata punctata* were studied by **Ray et al.(2008)**,their findings revealed that starvation, dehydration or exposure to electric shock caused a significant decrease in the body weight, relative weight, peripheral and central epithelial heights of the follicles and peroxidase activity of the thyroid gland of turtles.

Hewitt et al. (2002) studied the morphology of the thyroid gland in American alligator epithelial cell height, width and area percent colloid and follicle area these variables were compared among study sites and between genders. No difference was detected in epithelial cell height, epithelial cell area, or follicle area among the sites, whereas significant differences were detected in epithelial cell width and percent colloid. Gender did not have a significant interaction with sites for any variable measured.

Seasonal changes in the activity of the reptilian thyroid have been described by **Weigmann (1932)** who found significant variations in the epithelial height in the thyroid of *Lacerta vivipara* which indicated much greater functional activity in summer than in winter. The same observation was made by **Eggert (1936 a and b)** for three different species of *Lacerta*, *agilis*, *vivipara* and *muralis*. However this author found no evidence of changes in histology corrected with the breeding seasons in these lacertilian species.

Kohel et al. (2001) studied the seasonal changes in thyroid function in a

terrestrial reptile *Gopherus agassizii*. Thyroid hormones were measured over a period of 2 years. Thyroxine T4 exhibited distinct cycles in both sexes, being lowest during hibernation and rising toward the time of emergence. Females exhibiting only one peak in T4, during the early spring. In males, T4 levels peaked in early spring and again in late summer. The desert tortoise has distinct activity patterns that include increasing feeding, mating and locomotor activity in the early spring and increasing mating and combat in the late summer. The temperature has a direct action on the thyroid hormones of the *Pseudemys scripta* turtle (**Licht et al., 1989 and 1990**). In non hibernating lizards, thyroid histology indicated high secretion activity even during the coldest months and the lowest epithelial heights were found during spring and early summer. These observations were noticed by **Evans and Hegre(1938)** in *Anolis carolinensis*; **Miller (1955)** in viviparous lizard *Xantusia vigilis* and **Hammouda et al. (1983)** in *Varanus griseus* and *Agama stellio*.

Bennett and Dawson (1976); Sinha and Choubey(1981) in Indian spiny tailed sand lizard *Uromastix hardwcki*; and **Akhmetove and Absamatove (1986)** reported that activity of thyroid hormones cause an increase in cellular metabolism. At high environmental temperature the thyroid gland in reptiles appeared to be most active, while it was inactive at low environmental temperature. Thyroid [triiodothyronine (T3) and thyroxine (T4)] hormones was determined by **Brasfield et al. (2008)** in Captive western fence lizards (*Sceloporus occidentalis*) and they noticed that thyroid hormones showed little cyclical activity throughout the breeding period , with the exception of small increases of T3 at weeks 8 and 16, possibly implying an active role of this hormone with ovulation in females.

Lynn (1970) stated that thyroid hormones appear to have the same function in the maintenance and simulation of metabolic rate in reptiles as in mammals. Thyroid stimulating hormone(TSH)secreted by the anterior lobe of the pituitary gland,induces the production and release of thyroxin and triiodotyronin of the thyroid gland. As the serum concentration of these hormones increases, the secretion of TSH is inhibited. Conversely, when thyroid

hormones levels decrease, the pituitary increases its output of TSH and consequently the thyroid gland increases the production and release of its hormones (Tietz, 1976; Tietz, 1995; Abdel-Rehem, 2002 and Virgilio *et al.*, 2003).

Materials and Methods:

The two species of lizards used in the present investigation Hardune Sina, Henhish, *Laudakia stellio brachydactyla* (Fig.1) and Gold skink, Orange tailed skink, Ummel-Haiyat, *Eumeces shneiderii* (Fig.2) lie under the same order Squamata and suborder Lacertilia. The first belongs to the family Agamidae and Genus *Laudakia*, while the second belongs to the family Scincidae and Genus *Eumeces*. The animals were collected monthly from Sina, Mediterranean coastal desert of Egypt. During the hibernation period of *Eumeces* (October-February) animals obtained by digging the desert localities where animals frequently live.

These specimens were trapped alive from the previous mentioned areas. In the laboratory the total body weight was measured for each specimen. The specimens were anesthetized with chloroform after which they carefully dissected.

The ventral part of the neck region of some of these animals was removed together with the head, pharynx and the vena jugularis on both sides. These parts were fixed in 40% formalin for 24 hours then stained by hematoxyline and cleared in glycerin, careful dissection is carried out under binocular microscope to find the exact position of the thyroid gland following the related blood vessels and nerves.

The thyroid gland was removed out immediately, fixed in Bouin's fluid, neutral formalin and Zenker's fluid.

Tissues were removed from the fixative, washed in 50% alcohol, dehydrated in series of ascending grades of alcohol, then cleared in xylene.

Embedding was done in hard grades of paraffin (melting points range from 60-62C). The embedding time was up two hours in three changes to allow a good penetration and the avoidance the harding of the tissue. Using a rotary microtome,

transverse sections were cut at 6 micron then mounted on clear glass slides.

The following staining methods were used to illustrate the different histological and histochemical features of the thyroid gland.

Hematoxylin and eosin to demonstrate the general histological structure according to **Bancroft and gamble (2002)**.

Periodic acid Schiff's coupled with alcian blue (Al/PAS) to demonstrate both acidic and neutral mucopolysaccharides according to **Lillie (1951)**. Mallory's triple stain to demonstrate connective tissues (**pearse,1977**)

Mercury bromophenol blue stain to demonstrate protein content according to **Mazia *et al.* (1953)**.

Result:

The thyroid gland in Ummel-Haiyat *Eumeces schneiderii* is transversely found ventral to the trachea. It extends between the two carotid arches and dorso-anteriorly to the heart (Fig. 3). It is covered with variable layer of fatty tissue dependent on the season of the year and food condition. After removing the fatty tissue, the thyroid gland appeared as a faintly red transverse ventral to the trachea. The thyroid consists of two lateral thick lobes united together by a narrow isthmus. The isthmus is dorso-ventrally compressed and it is found directly ventral to the trachea.

In a Hardune Sina, *Laudakia stellio brachydactyla*, the thyroid gland consists of clear bilobed structures on either side of the trachea with a narrow connecting isthmus, usually the gland is surrounded by a cervical lymphsinus, so separates the gland from the trachea and pharynx dorsally from the neck muscles ventrally (Fig.4).

The blood supply of the thyroid gland is differentiation into arterial and venous blood vessels. The arterial blood vessels consists of two groups. Each group consists of three arches, the carotid, the systemic, and the pulmonary arches. The two aortic arches arise separately, the left one ventrally from the right side of the ventricle and goes to the left side of the animal. The right one arises more dorsal to the left arch and gives at its beginning the innominate artery which is very short and

soon divides giving the right and left carotid arches. Each one of the carotid arches runs outwards and forwards till it reaches the side of the neck. Posterior and parallel to it runs also the aortic arch. Generally both arches on each side run very close to each other but sometimes they are little separated. The aortic arch turns dorsally before it reaches the level of the anterior part of the carotid arch, it receives the ducts caroticus from the common carotid artery, then it curves backwards and inwards round the oesophagus thus becoming dorsal. The two aortic arches of both sides unite behind the level of the heart forming the dorsal aorta. The pulmonary arch takes its origin from the ventral right side but to the left of the left aortic arch, then it is twisted and becomes dorsal to the carotid and aortic arches. It divides giving a pulmonary artery to each of the lungs.

Interiorly, the venous blood is collected by three main venae cavae, a right anterior, a left anterior and a posterior vena cava, empty into the sinus venosus. The right anterior vena cava starts by the union of the right internal and external jugular veins, but the left anterior vena cava starts by internal jugular vein only. The mentioned blood supply represents the general plan of the normal individuals. Different individuals differ however in respect of the number of the blood vessels connected with the thyroid gland and in the presence of the left branch of the vena trachealis or external jugular vein. The number of the blood vessels connected with the thyroid gland increases with the increased size of the gland.

Histological investigation of the thyroid gland of *Laudakia stellio brachydactyld* and *Eumeces schneiderii* revealed that the gland is surrounded by a lymph space which, separates the thyroid from the oesophagus and trachea dorsally, and from the muscles of the neck ventrally all around the thyroid tissue there is a connective tissue is continuous with the inter-follicular connective tissue. In both animals, this gland is composed of a great numbers of various shaped follicles which vary in diameter from 26 to 55 μ in *Laudakia stellio brachydactyla* (Fig.5) and from 15 to 57 μ in *Eumeces schneiderii* (Fig.6). The follicles are held together by a loose connective tissue that varies in

amount according to the activity of the gland. However, in case of inactivity of the gland the follicles are wide.

There are frequently groups of lymphocytes mostly found separated where the inter-follicular spaces are filled with blood sinusoids both the anterior and posterior limits of the thyroid gland. The lymphocytes may be numerous or few and in many cases, they are found in the middle of the thyroid tissue between the acini. When the lymphocytes are found, they are either in the form of small cells aggregated close to each other or big and small lymphocytes are found together with few reticular connective tissue fibers. The lymphocytes mostly surround by small blood capillaries.

Each thyroid follicle is composed of one layer of epithelial cells surrounding the colloid. The simple epithelium lining the follicles varies in height from flat to columnar depending upon the functional state of the follicles and the amount of colloid present in its lumen. The colloid is the secretion given by the epithelial cells of the thyroid gland and it contains the hormone or group of hormones characteristic to the thyroid. Hormones of the thyroid are given to the body through the blood sinusoids found between the follicles.

The colloid of active gland is characterized by the presence of apparently empty vacuoles at its periphery. The number and size of the peripheral vacuoles depend on the degree of the activity of the thyroid gland. They increase with the increased activity of the gland. In highly active glands, the colloid is foamy due to the big number of peripheral vacuoles. The central vacuoles are another kind of vacuoles found in the middle of the colloid mass in the form of the empty spaces. In partially active glands, few acini have central vacuoles in their colloid, but in active glands their number increases greatly. In some of the very active glands they are practically present in every acinus. These vacuoles contain mostly stainable clots and in some glands the vacuoles contain colloid droplets.

In cases of hyperactivity of the gland, there is an increased release of thyroxin, the colloid is depleted and the cells become tall columnar, the nuclei become bigger less

darkly stained and the cytoplasm is granular (Fig.5) while in the inactive gland, little thyroxin is released and more colloid is stored. The cells become flattened, the nuclei are small elongated and darkly stained and the cytoplasm is clear (fig.6).

In the thyroid gland of both animals, it was noticed that the acini of the same gland are in different states of activity. Usually the central acini are more active than the peripheral ones. The acini of the inactive part of the section are close to each other, while those of the active part are separated by big turgid blood sinusoid.

The thyroid gland of adult *Laudakia stellio brachydactyla* undergoes certain changes in the different seasons of the year.

During winter, (November to January), the thyroid gland is sometimes still active, but mostly it shows inactive. It is poorly vascular and the acini are big polygonal or rounded close to each other. Epithelial cells are mostly flattened but they may be cubical, separating walls are mostly clear, nuclei are oval found at the base of the cell. Colloid is filling the lumen. Lymphocytes may be very much concentrated, especially at the periphery (fig. 7).

During spring, (February to April) the thyroid gland begins to resume its activity after being partially active during the winter. It becomes more vascular, rounded acini, cells are more or less cubical epithelial cell with oval, rounded or even elongated nuclei which nearly fill all the cells. In most acini there are few peripheral vacuoles. The cytoplasm is clear. The colloid is separated from the epithelial cells and has few peripheral vacuoles. From this it can be deduced that the thyroid is partially active and some acini are completely inactive. At the end of this period the thyroid gland increases greatly its activity. Epithelium is columnar with very clear cytoplasm, and very clear separating walls, nuclei are mostly rounded. Colloid is not filling all the lumen (fig. 8).

During summer, (May to July) the thyroid gland is also very active, acini are small with small lumen. Epithelial cells are very high with distinct separating walls. Cytoplasm is granular, nuclei are big rounded or oval with the long axis parallel to the separating walls. Colloid is very thin and does not fill the narrow lumen (fig. 9).

During autumn, (August to October) the activity of the thyroid gland begins to be reduced. The acini are big and separated by big turgid blood sinusoids, the epithelium is cubical or low columnar. Nuclei are rounded or oval found at the base of the cells. The separating walls are very clear; colloid is thin with many small peripheral vacuoles and few small central vacuoles.

From these observations it is noticed that the activity of the thyroid gland of *Laudakia stellio brachydactyla* begins to increase gradually in February and reaches its maximum in June and July then it begins to decrease once more and reaches a minimum in December and January. The thyroid is never completely inactive in the winter because the animal is non-hibernation and is active the whole year around.

In *Eumeces schneiderii*, the thyroid gland is completely inactive in winter. It is poorly vascular. Acini are big rounded found close to each other and completely filled by colloid. The epithelial cells are completely flattened, the cell membranes accepted faint appearance (fig. 10).

In spring, there are some glands which are still mostly inactive with only few acini showing an active production of colloid. The active part of the thyroid is moderately vascular with rounded acini. The epithelium is more or less cubical but sometimes it is higher. Nuclei are big rounded found more or less in the middle of the cell. Colloid is mostly nearly filling all the lumen with few peripheral vacuoles. In some glands big central vacuoles in the colloid are frequent; some of these vacuoles are filled with minute colloid droplets (fig.11).

In summer, most of the acini become activated, it is moderately vascular. Acini are rounded. Epithelial cells are low columnar. Nuclei are at the base of the cells. Colloid is nearly filling all the lumen with very few vacuoles (fig.12). The thyroid gland of *Eumeces schneiderii* is reduced in activity. The gland is poorly vascular and acini are big and oval. The colloid is nearly filling the acinus with few vacuole, nuclei are oval or rounded found at the base of the cells.

The thyroid gland of *Eumeces schneiderii* shows complete inactive during the hibernation period (October to

February), then it begins to show slowly and gradually an increase in its activity (March to April), till it reaches a maximum in the summer (June and July), then once more gradually it becomes less active (August to September).

In *Eumeces* neutral mucopolysaccharides are found at the colloid mass (fig.13) in hibernation period and in the summer (fig.14&Table 1),but in *Laudakia* the mucopoly-saccharides appear in the colloid mass, basement membrane of the follicle

and in the connective tissue between the follicles (fig.15) in winter and in the spring (fig.16&Table 1).

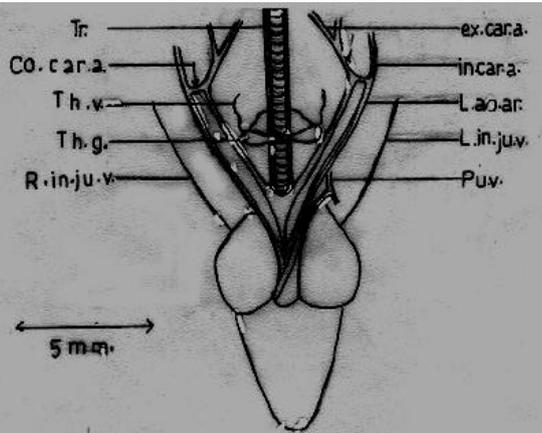
The protein appear in the colloid mass inside the follicle of the thyroid gland of *Laudakia* and *Eumeces* so, the amount of protein depended on the presence of thyroxin (fig.17) in *Laudakia*, and *Eumeces* (Fig. 18) in hibernation period or released it (fig.19) in *Laudakia* and *Eumeces* in summer (fig.20&Table 1).



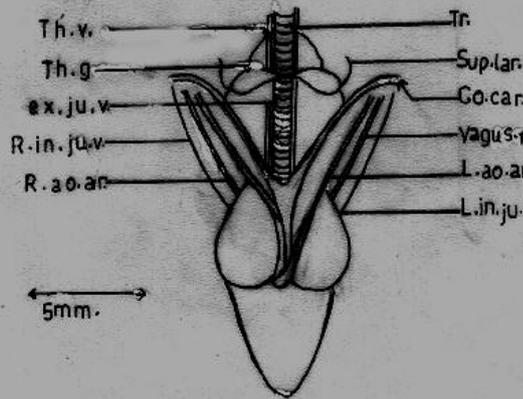
Fig. (1)



Fig. (2)



Fig(3)



Fig(4)

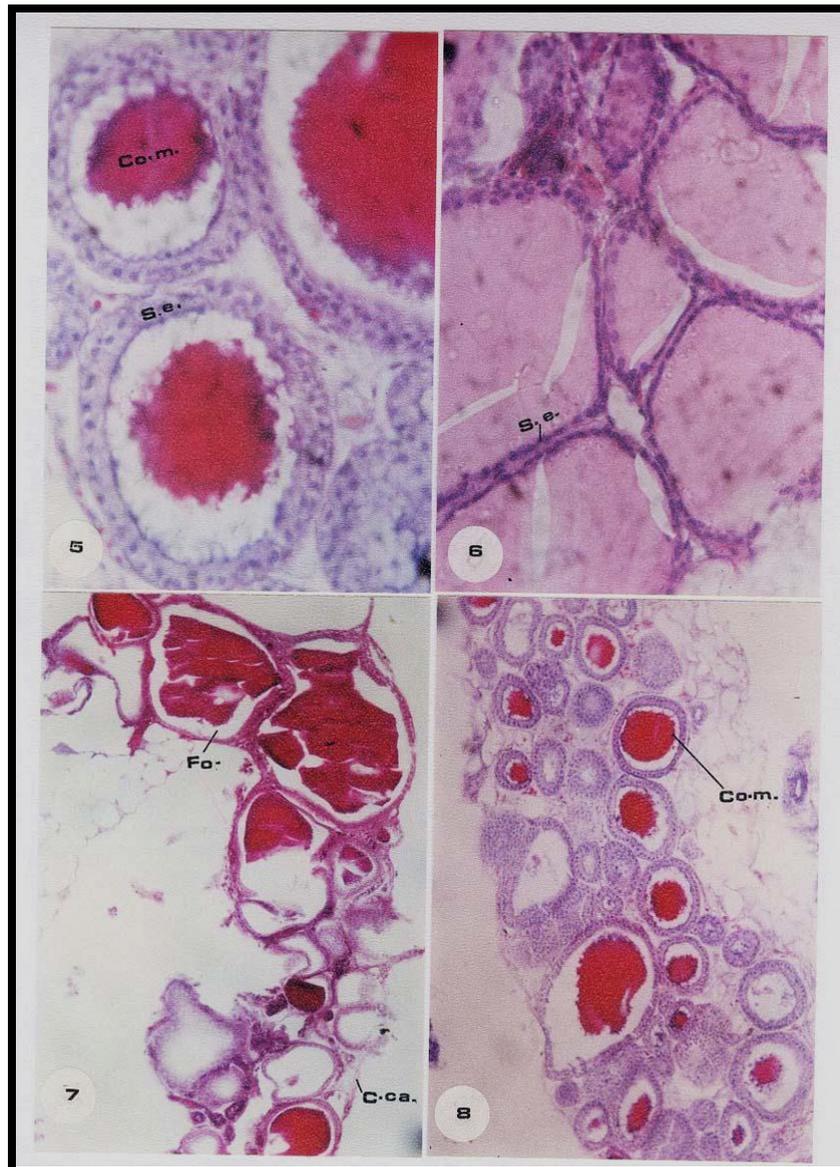


Fig. (5): Photomicrograph of a section in thyroid gland of *Laudakia stellio brachydactyla*, showing different sizes and active acini (Mallory's triple stain x 400). **Fig. (6)** Photomicrograph of a section in thyroid gland of *Eumeces schneiderii*, showing different sizes and inactive acini (Hx & E stain x 400) **Fig. (7):** Photomicrograph of a section in thyroid gland of *Laudakia stellio brachydactyla*, during winter (Mallory's triple stain x 100). **Fig. (8):** Photomicrograph of a section in thyroid gland of *Laudakia stellio brachydactyla*, during summer (Mallory's triple stain x 100).

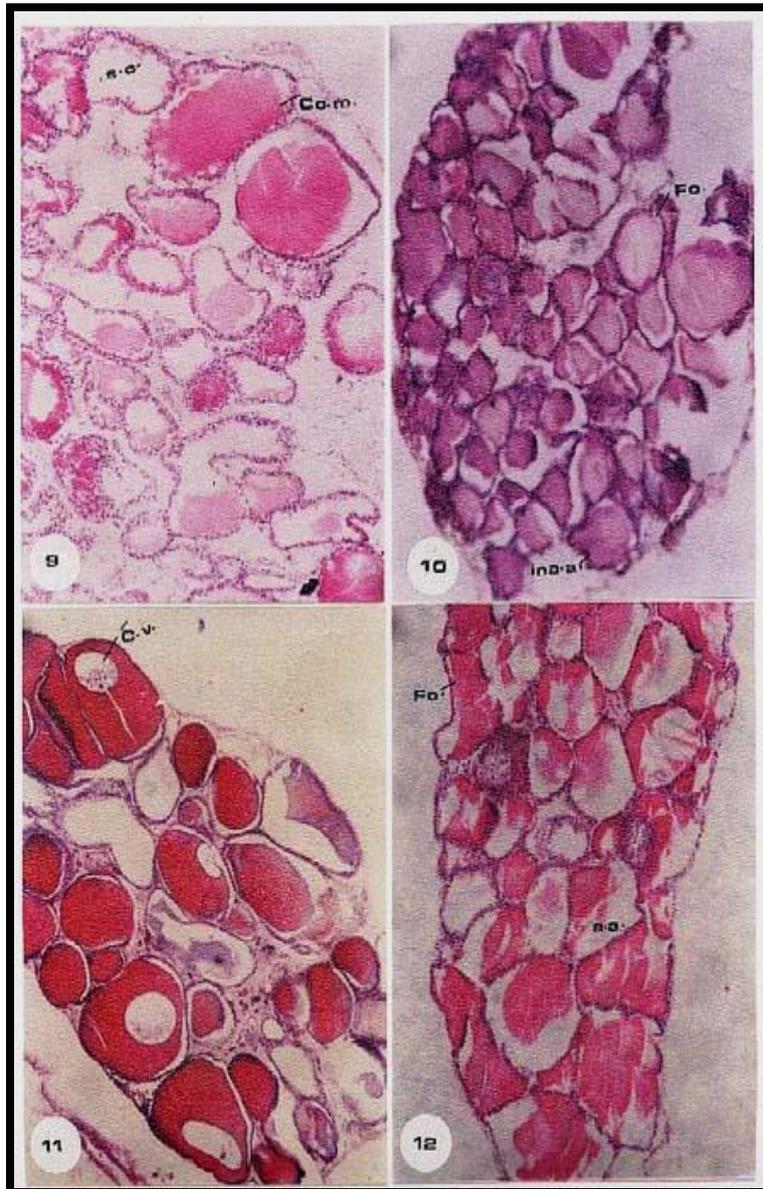


Fig. (9): Photomicrograph of a section in thyroid gland of *Laudakia stellio brachydactyla*, during the autumn (Hx & E stain x 100). **Fig. (10):** Photomicrograph of a section in thyroid gland of *Eumeces schneiderii*, during the winter. (Hx & E stain x 100). **Fig. (11):** Photomicrograph of a section in thyroid gland of *Eumeces schneiderii*, during the spring. (Mallory's triple stain x 100). **Fig. (12):** Photomicrograph of a section in thyroid gland of *Eumeces schneiderii*, during the summer. (Hx & E stain x 400).

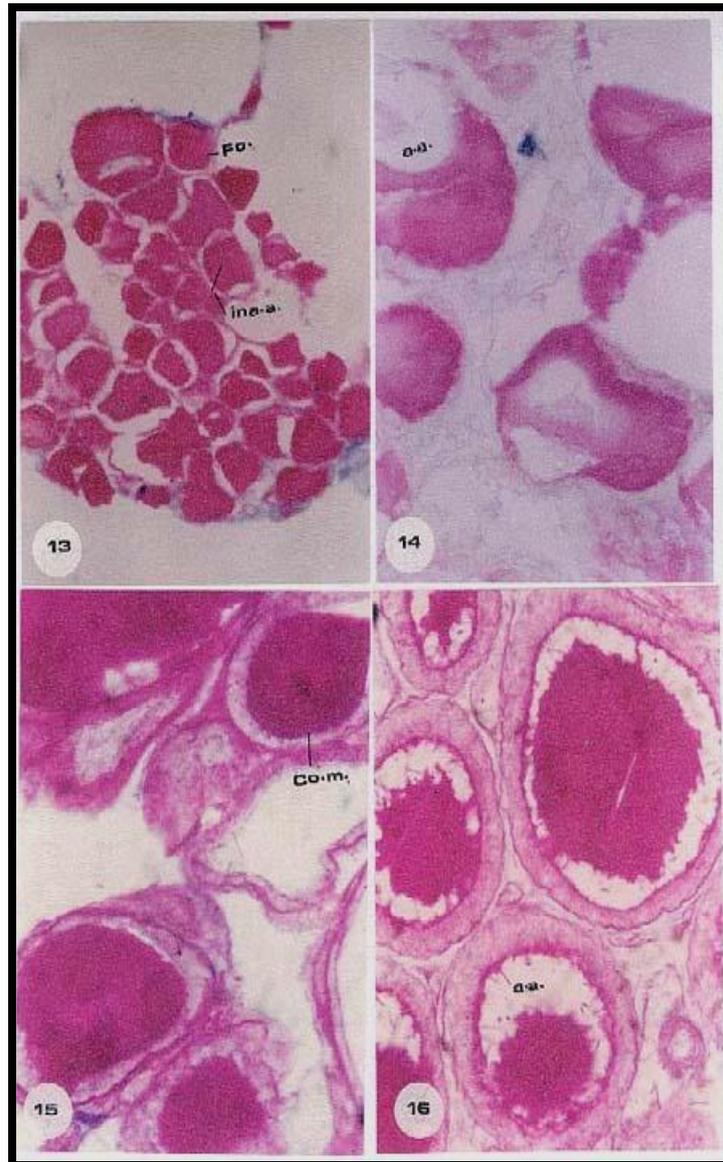


Fig. (13): Photomicrograph of a section in thyroid gland of *Eumeces schneiderii*, illustrated mucopolysaccharides in hibernation (Alcian PAS stain x 100); **Fig. (14):** Photomicrograph of a section in thyroid gland of *Eumeces schneiderii*, illustrated mucopolysaccharides in summer (Alcian PAS stain x 400); **Fig. (15):** Photomicrograph of a section in thyroid gland of *Laudakia stellio brachydactyla* illustrated mucopolysaccharides in winter (Alcian PAS stain x 400); **Fig. (16):** Photomicrograph of a section in thyroid gland of *Laudakia stellio brachydactyla*, illustrated mucopolysaccharides during the spring (Alcian PAS stain x 400)

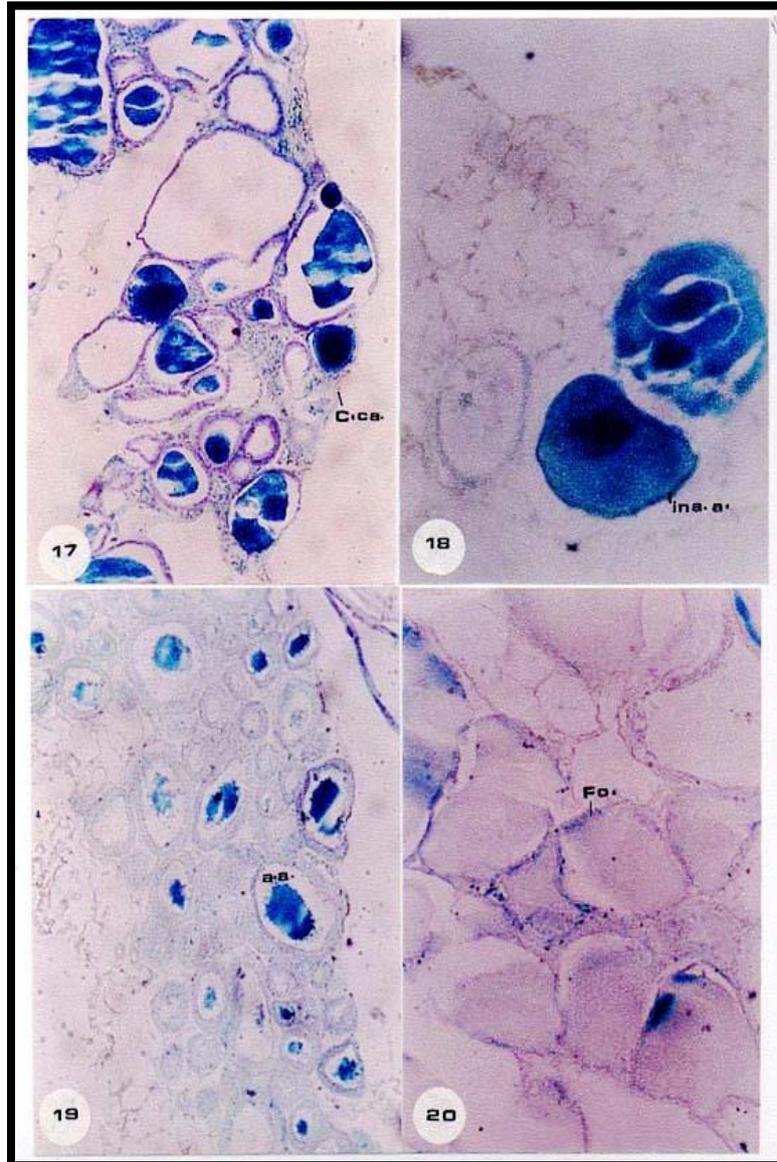


Fig. (17): Photomicrograph of a section in thyroid gland of *Laudakia stellio brachydactyla*, illustrated the protein during the winter (Bromophenol blue stain x 100); **Fig. (18):** Photomicrograph of a section in thyroid gland of *Eumeces schneiderii* illustrated the protein during the hibernation (Bromophenol blue stain x 100); **Fig. (19):** Photomicrograph of a section in thyroid gland of *Laudakia stellio brachydactyla*, illustrated the protein during the summer (Bromophenol blue stain x 100); **Fig. (20):** Photomicrograph of a section in thyroid gland of *Eumeces schneiderii* illustrated the protein during the summer (Bromophenol blue stain x 200);

Table (1): Statistical analysis of the quantitative measurements (Pixel) of carbohydrates (PAS stain), protein (Bromophenol blue stain) of thyroid gland of Eumeces and Laudakia in different seasons.

		Eumeces				Laudakia			
		Winter	Spring	Summer	Autumn	Winter	Spring	Summer	Autumn
PAS	Average	152.2	170.9	178.5	162.8	177.2	198.8	213.1	183.8
	S.D.	12.273	21.784	14.961	16.963	14.838	16.890	11.939	23.752
	t-test		2.95E-02	4.33E-04	1.27E-01		7.07E-03	1.22E-05	4.66E-01
	Probability		Sgn.	H.Sig.	Non Sig.		H.Sig.	H.Sig.	Non Sig.
	%		0.123	0.173	0.070		0.122	0.203	0.037
Bromophenol	Average	116.2	153.6	154.5	132.6	134	156.8	167.8	142.3
	S.D.	24.055	34.818	30.938	13.818	32.159	29.873	29.645	8.327
	t-test		1.20E-02	6.31E-03	7.79E-02		1.18E-01	2.51E-02	4.40E-01
	Probability		Sgn.	H.Sig.	Non Sig.		Non Sig.	Sig.	Non Sig.
	%		0.322	0.330	0.141		0.170	0.252	0.062

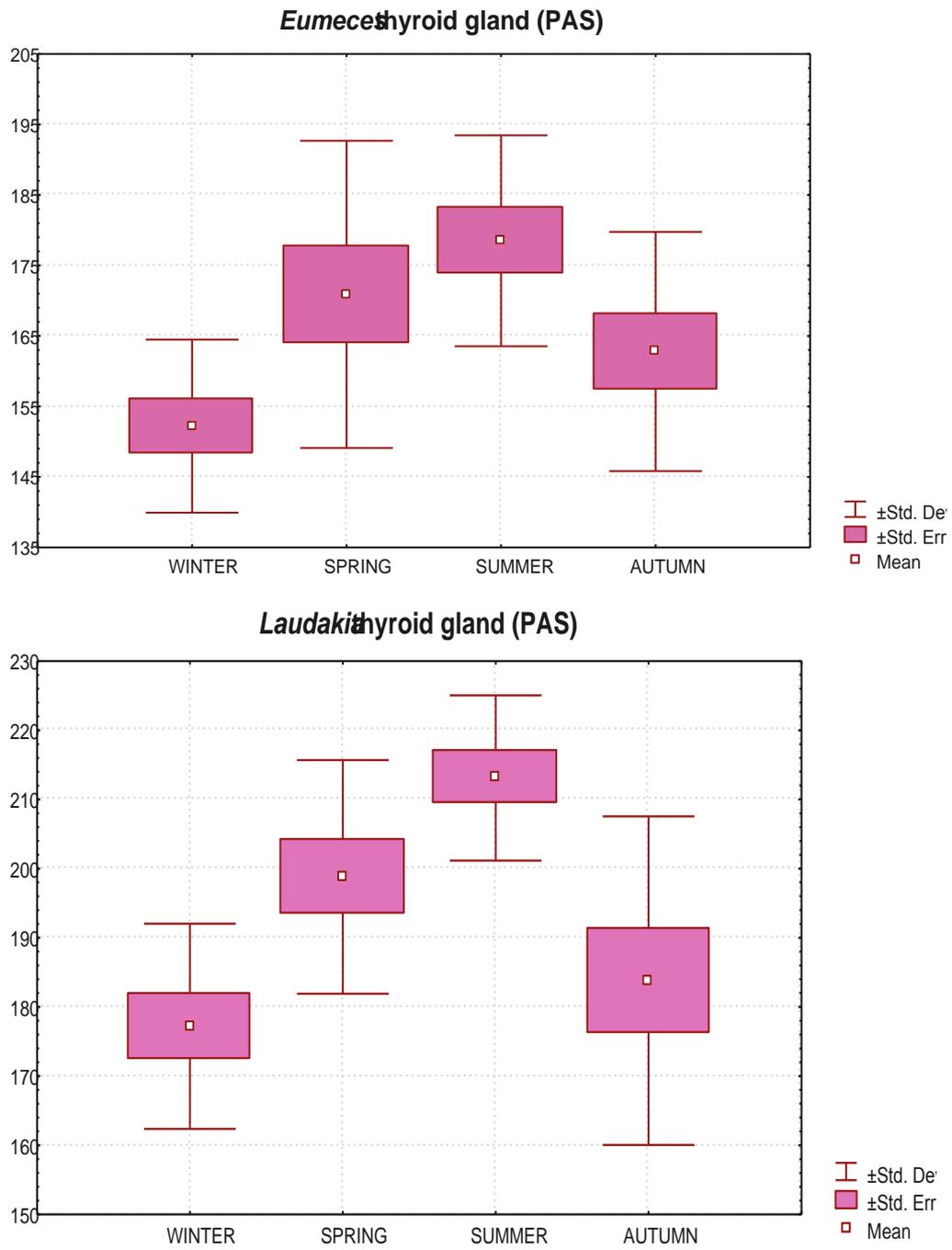
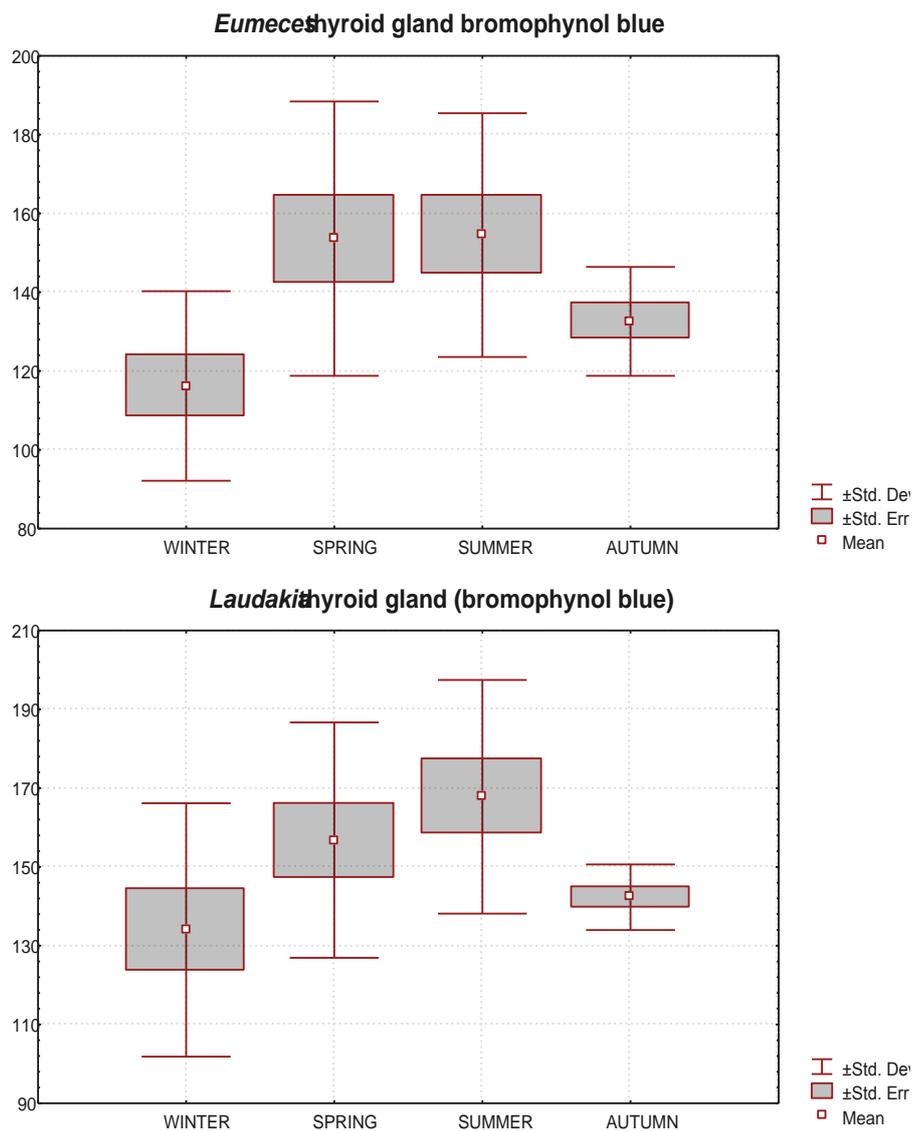


Figure (21): The quantitative analysis of polysaccharides in the thyroid gland of *Eumeces* and *Laudakia* in different seasons.



Figure

Figure (22): The quantitative analysis of total protein materials in the thyroid gland of *Eumeces* and *Laudakia* in different seasons.

Abbreviations list:

C.Ca.: Connective tissue capsule.
Fo. : Follicle.
S.e.: Simple epithelium.
V.: Vacuoles.

A.c.t.: Areolar connective tissue.
Com.: Colloidal mass.
A.A.: Active acini.
E.C.: Empty cell

Discussion:

The bilobed thyroid gland of *Laudakia stellio brachydactyla* is formed of two lobes each lobe is lying on either side of the trachea with a narrow isthmus. This finding was described by **Lynn et al. (1966)** in the family *Agamidae* based on 151 specimens representing 53 species belonging to 26 genera. From this group, these authors found only 16 that possess bilobed thyroid gland. **Hammouda et al. (1983)** gave the same description of the thyroid gland in *Agama stellio*.

The groups of lymphocytes found on both animals in the anterior and posterior limits of the thyroid gland is in agreement with that described by **Sidkey (1955)** in *Chalcides ocellatus* and **Hammouda et al. (1983)** in *Agama stellio*. **Viguier (1909 a)** investigated the thyroid gland of the gecko *Tarentola mauretaniae* and described the presence of lymphoid tissue in variable places of the thyroid, but **Eggert (1934)** described the presence of lymphoid tissue on the side of the thyroid in *Gymnodactylus marmoratus*. **Eggert (1935)** described the presence of aggregations of lymphocytes in the thyroid glands of *Lacerta agilis*; *L. vivipara* and *L. muralis* in the inter follicular spaces and mentioned that the lymphocytes are never found in the young individuals. Seasonal changes in the histological appearance of the thyroid in lizards were reported by **Weigmann (1932)** in *Lacerta* indicated a higher functional activity in summer than in winter. **Eggert(1936a)** studied three different species of *Lacerta* and stated that the seasonal changes seen in animals collected in the field are mainly dependent upon environmental temperature. **Miller (1955)** in viviparous lizard noticed the lowest activity during the cold season. **Wilhoft (1963-1964)** stated that in the tropical Australian lizard there are also variations in the thyroid activity in both males and females that are related to the reproductive cycle. In *Agama agama savattieri* a marked increase in the thyroid activity is found in March and April as compared with January and February (**Charnier and Dutarte,1956**). **Hammouda et al. (1983)** in *Agama stellio* and *Varanus griseus* gave a description of epithelium of thyroid over a period of

several successive seasons and found that the thyroid exhibits signs of maximal activity during June and July manifested in the increase of the epithelium heights and the stored colloid. These findings are in accordance with the same results obtained here in *Laudakia stellio brachydactyla* and *Eumeces schneiderii*.

Reproductive processes are profoundly affected by abnormal thyroid function, suggesting that thyroid hormones may in part control neurosecretory cells in the hypothalamus, which in turn affect the release of gonadotrophic hormones by the anterior lobe of the pituitary gland (**Weichert, 1970**).

The cyclic changes of the thyroid gland in reptiles in a good relation with their reproductive cycle, these observation are in agreement with those of **Eggert (1935)** in *Lacerta vivipara*. He noticed a slight activation in the thyroid gland of pregnant females, in the same species it was postulated that the effect of the thyroid in the gonads may be indirect partly due to a decrease in general metabolism and partly to some inferences with anterior pituitary function (**Eggert, 1937**). In *Anolis carolinensis* there is an increase in thyroid epithelial height in ovulating females (**Evans and Hegre, 1938**). In *Chemmys leprosa* increased activity of the thyroid during sexual activity in both males and females was noticed by **Combescot (1956)**. In 2009, **Sciarrillo et al.**, studied the localization and role of galanin in thyroid gland of *Podarcis Sicula* lizard and found that prolonged galanin (GAL) administration increased T4 and T3 release, but decreased the plasma concentration of TSH. these findings suggest that systemic administration of GAL was able to stimulate the thyroid gland of the lizard both morphological and physiological level. in *Leiopisma rhomboidalis* high thyroid activity in females during yolk deposition and in males during spring and fall period of spermatogenesis and increased reproductive activity were recorded by **Wilhoft (1963 and 1964)**. In case of hyperactivity of the two species in the present study increased release of thyroxine and the colloid is depleted, these results agree with those of **Bennett and Dawson**

(1976); **Sinha and Choubey(1981)**. In *Uromastyx*. **Akhmetov and Absamatov(1986)** reported that during the activity of reptiles the thyroid hormones appeared to be most active, while during the hibernation, the thyroid hormones were almost inactive. On the other hand **Abdel-Fattah et al. (1991)**; **Lea et al. (1992)** and **Totzke et al. (1999)** reported that the decline in thyroid hormones could be attributed to the reduction of the metabolic rate which results in spring of energy reserves. The distribution of carbohydrates and protein in *Eumeces* and *Laudakia* was increased during the summer and decreased during the winter, similar to *Viera aspis* (**Naulleau et al., 1986**) and **Virgilio et al. (2004)** in *Podarcis sicula*.

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دراسات تشريحية وكيميائية نسيجية للغدة الدرقية لاثنين من الزواحف المصرية

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يتضمن هذا البحث دراسة مقارنة لاثنين من الزواحف يقطنان الصحارى المصرية احدهما ليس لة بيات شتوى هو (حردون سيناء) والآخر لة بيات شتوى هو (ام الحيات) واشتملت المقارنة على التركيب التشريحي والهستولوجى للغدة الدرقية.

وقد خلصت الدراسة الى النتائج التالية:

من الدراسة التشريحية لوحظ ان الغدة الدرقية على هيئة فصين على جانبى القصبه الهوائية يربطهما برزخ ولكنهما اقرب الى القلب فى ام الحيات منها فى الحردون اما الدراسة الهستولوجية فقد دلت على وجود تشابه كبير فى كلا النوعين فالغدة تتركب من عدد كبير من الحويصلات المختلفة الاحجام المليئة بمادة غروية وترتبط هذه الحويصلات بعضها ببعض بواسطة نسيج ضام غنى بالجيوب الدموية وقد وجد ان نشاط الغدة الدرقية يكون غير ملحوظ فى ام الحيات اثناء البيات الشتوى بينما تكون فى حردون سيناء فى حالة نشاط جزئى ويعزى ذلك لعدم وجود بيات شتوى لهذا الحيوان