

# THE MORPHOLOGY AND HISTOLOGY OF THE THYROID GLAND IN FOUR LACERTILIAN SPECIES FROM BANDUNG

by

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## INTRODUCTION

In turtles, crocodilians, snakes and lizards, the thyroid is said by many textbooks to be unpaired, but it has recently been shown that considerable variation occurs in its morphology in various species of lizards.

LYNN and WALSH (1957) and LYNN and KOMOROWSKI (1957) described the thyroid gland in twenty-three different lacertilian families, representing forty-eight species. They found that in this group of reptiles, the shape of the gland varied from species to species from a single unpaired gland to two completely separate glands, with some species having a bi-lobed thyroid connected by an isthmus. Among the representatives of the family Gekkonidae which they studied, for example, some species were found to have an unpaired median thyroid, others had a paired thyroid, and still others had a bi-lobed thyroid. In the family Scincidae, on the other hand, the thyroid was unpaired in all of the species examined. Apparently a great variation can occur even within a single lizard family.

In the present report, descriptions are given of the morphology and histology of the thyroid glands of four additional species of lizard, representing two families and four genera. All four species are common to the Bandung area:

Family Scincidae : *Mabuya multifasciata*,

Family Gekkonidae : *Hemidactylus frenatus*, *Cosymbotus platyurus*  
and *Peropus mutilatus*.

## MATERIALS AND METHODS

The animals used in this study were collected in the vicinity of the Institute of Technology in Bandung. In all, the thyroid glands of fifty-four specimens of *H. frenatus*, twenty-one specimens of *C. platyurus*, ten specimens of *P. mutilatus*, and thirty-four specimens of *M. multifasciata* were examined.

The animals were killed with chloroform. A medio-ventral skin incision was then made in the region of the chest and throat. A second incision was made slightly craniad through the sternum. All the muscles were removed carefully to expose the thyroid which could be readily seen extending transversely across the trachea, craniad to the heart. Sometimes the gland was found to be imbedded in fat tissue. When this occurred, the fat tissues were also carefully removed.

The dissections were carried out under a binocular microscope to avoid damaging the glandular tissues.

For the morphological observations, the specimens used were preserved in four percent formalin.

For the histological observations, the thyroid glands were fixed in four percent formalin. They were sectioned at seven microns, and stained with hematoxylin and eosin.

The drawings were made with the aid of a camera lucida.

#### MORPHOLOGICAL OBSERVATIONS

No morphological differences were found in the thyroid glands of *H. frenatus*, *C. platyurus*, or *P. mutilatus*. The glands in all these species were M-shaped, consisting of two lateral lobes connected by an isthmus. They extended transversely below the trachea, craniad to the heart. The position of the glands on the trachea, however, differed in the relation of the gland to the heart in the three species.

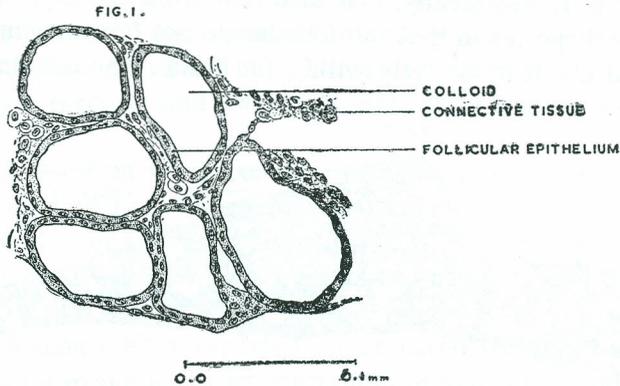
The thyroid gland lay closest to the heart in *C. platyurus*, the distance between the gland and the heart being about the length of six tracheal rings. In *H. frenatus* it was at a distance of eight tracheal rings; while in *P. mutilatus* there were ten tracheal rings between the gland and the heart.

The shape of the glands in different specimens of the same species sometimes deviated from the usual shape. For instance, occasionally there were additional lobes or bulbs at the isthmus or on the lateral lobes, which made the glands look asymmetrical. These irregularly-shaped thyroid glands occurred both in the male and female specimens. They were found in twenty percent of *C. platyurus* specimens; twenty percent of *P. mutilatus* specimens and none of *H. frenatus* showed this abnormality.

In contrast to the thyroid glands of the three gekkonid species, the thyroid gland of *M. multifasciata* was found to have only a single lobe. In this case, the gland was V-shaped, with the apex directed away from the heart. Each arm of the gland ended in a smaller bulb. It lay on the ventral side of the trachea at a distance of thirteen tracheal rings from the heart.

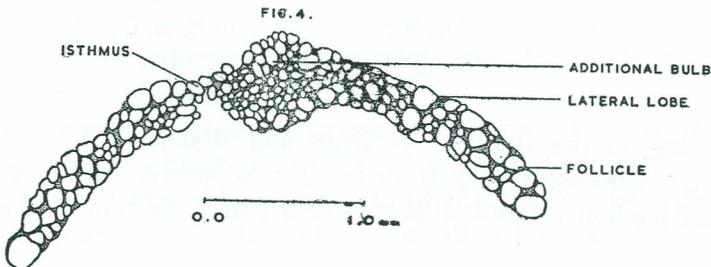
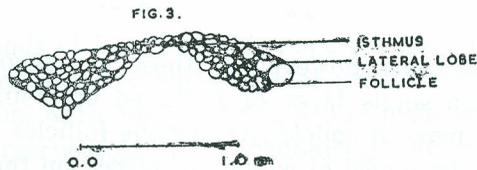
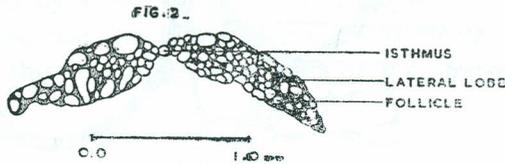
HISTOLOGICAL OBSERVATIONS

Among the three species of the family Gekkonidae, no differences in the cellular arrangement of the glands were found (fig. 1).



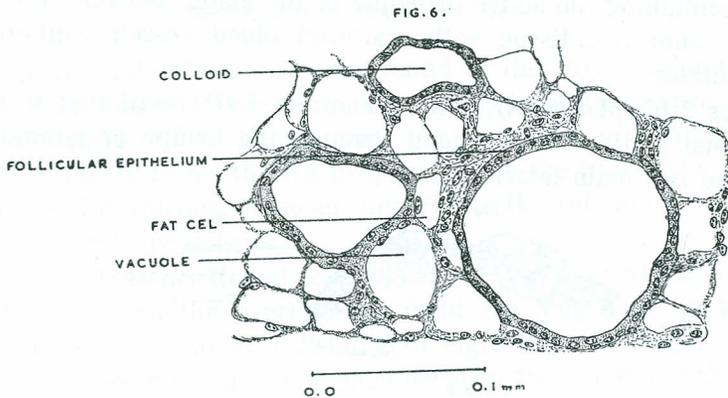
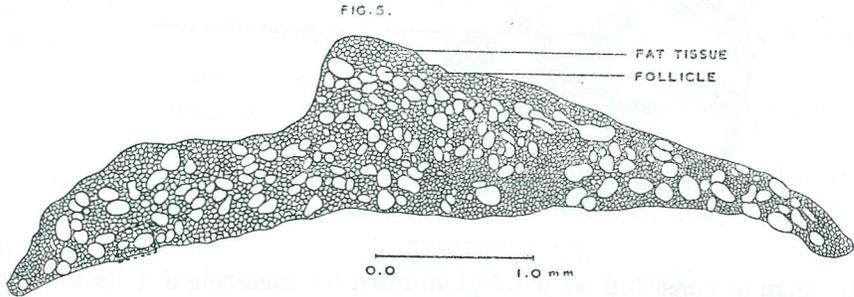
The glands consisted of a large number of spheroidal follicles, each one lined with flattened epithelial cells. The follicles were filled by a mass of colloid containing the active principle of the gland. Between the follicles there was connective tissue with scattered blood vessels containing red blood corpuscles.

Figures 2 (*C. platyurus*), 3 (*H. frenatus*), 4 (*P. mtilatus*) each shows a longitudinal section of the gland through the bridge or isthmus which connects the two main lateral lobes.



In fig. 4 an additional bulb placed on one of the lateral lobes can be seen which makes the gland look asymmetrical.

The longitudinal section of the thyroid of *M. multifasciata* is represented in figs. 5 and 6. Histologically, it is different from the thyroid glands of the three gekkonid species in that the follicles do not form a compact gland, but are scattered about irregularly within fat tissue. The cellular structure



of the follicles is the same, however, as those of gekkonids. That is, the follicular cells form a single layer of flattened epithelial cells, and each follicle is filled by a mass of colloid. Among the follicles there are fat cells with large vacuoles, the nuclei of which are placed on the periphery of the cells.

#### DISCUSSION

According to the findings of LYNN and WALSH (1957), the thyroid glands of the gekkonids vary from species to species; some species have an unpaired median thyroid, others have a paired thyroid, and still others

have a bi-lobed thyroid. Their observations included seven species belonging to the family Gekkonidae:

*Aristelliger praesignis*, which has two completely separate lobes, *Sphaerodactylus argus*, *S. goniorhyncus*, *Stenodactylus sthenodactylus* and *Ptyodactylus hasselquisti*, which have two lobes connected by an isthmus, and *Hemidactylus turcicus* and *Tarentola mauritanica* which have a single lobe.

The thyroid gland of the three species of Gekkonidae examined from Bandung all consist of two lobes connected by an isthmus. By comparing this finding with that of LYNN and WALSH (1957) on *Hemidactylus turcicus*, it is shown that even within a single genus the morphology of the thyroid varies from species to species.

LYNN and WALSH (1957) reported an unpaired thyroid gland to occur in all of the species examined from the family of Scincidae, and the thyroid of *Mabuya multifasciata* from Bandung showed no gross variation. Although LYNN and WALSH did not make a histological study, the curious histological structure of *Mabuya multifasciata* reported here, sets it apart from the gekkonids.

The presence of additional bulbs on some of the glands, which makes them appear asymmetrical, is interpreted as a thyroid hyperplasia since the follicular structure appears normal histologically. Presumably, this hyperplasia is caused by a lack of iodine, and the bulb develops as a compensatory device, because the iodine demands of the animal exceed the available supply of this essential component of the thyroid hormone.

#### SUMMARY

1. The thyroid glands of four lacertilian species from the Bandung area: *Hemidactylus frenatus*, *Cosymbotus platyurus*, *Peropus mutilatus*, *Mabuya multifasciata* were morphologically and histologically studied.
2. There were no morphological and histological differences between the thyroid glands of the species of Gekkonidae: *H. frenatus*, *C. platyurus*, and *P. mutilatus*. The glands in these species consist of two lateral lobes connected by an isthmus. Histologically, they do not differ from the typical thyroid structure.
3. The thyroid of *Mabuya multifasciata* is V-shaped, with its apex directed away from the heart. It consists of a single median lobe with two smaller lobes at the end of each arm of the gland. Histologically, the thyroid follicles are loosely scattered about within fat tissue.

## REFERENCES

- LYNN, W. G., and G. A. WALSH, 1957. The morphology of the thyroid gland in *Lacertilia*. *Herpetologica*, 13:3.
- and L. A. KOMOROWSKI, 1957. The morphology of the thyroid gland in lizards of the families *Pygopodidae* and *Amphisbaenidae*. *Herpetologica*, 13 : 3.
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