

## The Role of Iodine and Thyroid Gland on Reproduction and Production of Chickens VI. Feathering

G.A.R. Kamar, and H.A.M. Al-Mulla Hasan

Animal Production Department, Faculty of Agriculture,  
Cairo Univ., Egypt.

THE EFFECT of desiccated thyroid gland and potassium iodide on Fayoumi chicks were investigated, chicks fed these thyroactive substances when they were 18 weeks old on two levels: 200g or 100g desiccated thyroid per 100kg diet and 39.213g or 19.60g potassium iodide per 100kg diet. Growth rate were of three categories fast, medium and slow. Results obtained in this particular work revealed that: Marked increase was observed in the absolute and relative feather weight of all treated pullets and the cockerels of fast and medium growing groups.

The daily injection of 3.8 to 5.7 g thyroxine in water suspension/100g of body weight, in N.H. chicks weighing 40-60g having completely destroyed thyroid gland, caused rapid feather development (Winchester *et al.*, 1949). The best feathering was observed in the best dosage of thyroprotein 36/CWT g of feed with an essay of 3.1% thyroxine (Irwine *et al.*, 1943). Bonne *et al.*, (1947) found that feeding levels up to 4.5g of thyroprotein 100 lb of feed had no effect on feater growth, but at levels within the range of 9 to 72 g feathering rate was significantly increased. Also, it was found that feeding thyroprotein by 10g/100 lb. of ration stimulated early growth of feather in R.I.R. (Weeler *et al.*, 1948) and W.L. Turner *et al.*, 1945). Whereas, in White Baladi cocks, feather weight decreased geratly by different levels of hyper thyroidism which was induced by feeding thyroprotein (Kamar, 1962).

Hens fed 1% sea weed meal have a short moulting period, and increased egg production following moulting (Romijn and Lokhorst, 1953). However, moulting can be induced with large doses of thyroxine or desiccated thyroid gland (Stukie, 1954).

Feeding of 0.1% thiouracil caused early moulting in birds (Sulman and Perek, 1947). Growth retardation of 300mg thiouracil for the cocks and 200mg for the hens. This dose took 15 days, then it was doubled for the next 25 days (Viotkevic and Kostin, 1947).

### Material and Methods

Four hundreds and fifty Fayoumi chicks hatched in December were fed the experimental ration shown in Table 1, Egyptian clover was supplied as green fodder. The chicks were brooded, reared and managed alike, body weight was recorded bi-weekly till the 18<sup>th</sup> week of age, then body weight was recorded monthly; sexing was carried out at 13<sup>th</sup> week of age. Each sex was divided into 3 categories: according to body weight, high; medium; low. At the 18<sup>th</sup> week of age birds were divided into 21 groups of treatments, 5 ups from the high weight birds, 5 groups from the low weight birds and 11 groups from medium weight birds. The specific treatment in every are shown in Table 2. All the applied treatments continued for two months up till 26<sup>th</sup> of age. Then, 3 pullets and 3 cockerels were slautered from every group of treatment. Feather weight was recorded, analysis of variance was done for the effect of different treatments used in the study.

TABLE 1. Experimental ration.

Ingredient	percentage
Corn	50
Rice brane	14
Wheat brane	10
Cortecated cotton seed meal	20
Fish meat	3
Calcium carbonate	2
Salt	0.5
Mineral mixture	0.5
Total . . . . .	100.0
Total protein	18.5
Crude fiber	10.0
TDN	27.0

### Results and Discussion

Significant increase in feather's weight was observed in the two sexes of medium growth group (Table 3). All thyroid treatments used here, stimulated feathering more than iodine treatments. This trend was more obvious in females rather than males (Table 3). Winchester *et al.* (1949), result's by thyroxine injection agrees with these findings. The two sexes of high growth rate group and pul-

lets of low growth rate showed increase in their feathers weight by the treatments (Table 3) but with insignificant differences (Table 4). Cockerels of low growth rate showed slight decrease in their feather's weights than the controls (Table 3) and also with insignificant differences (Table 4). Similar insignificant results were found by Boone *et al.*, (1947) with respect to these later findings.

TABLE 2. The different treatments used in the study.

Growth rate	No. of treatment	Treatment substance, level and time
High Medium Low	I	A. Treatments used in the three levels of growth desiccated thyroid high level for two months 200g per 100kg of diet.
	II	Desiccated thyroid low level for two months 100g per 100kg of diet.
	III	Potassium iodide high level for two months 39.213g per 100kg of diet containing 30g I .
Medium	IV	Potassium iodide low level for two months 19.60g per 100kg of diet containing 15g I .
	V	Controls. B-Additional treatments used in the medium level of growth only.
	VI	Desiccated thyroid high level after sulfa treatment of low level for a month, 100g/100kg of diet.
	VII	Potassium iodide high level after sulfa treatment of high level for a month.
	VIII	Desiccated thyroid high level after sulfa treatment of high level for a month 300g/100kg of diet.
	IX	Potassium iodide high level after sulfa treatment of high level for a month.
	X	Desiccated thyroid high level after serving as control for a month.
	XI	Potassium iodide high level after serving as control for a month.

Since an excess of heat may be produced by hyper-thyroidism in the slow growing cocks, the amount of circulating blood increased in such cocks over their control. This may have occurred to enhance the rate of heat dissipation by peripheral circulation in the body surface, by urine secretion from the kidneys and by evaporating water from the lungs. Accordingly, the feathers of treated birds were shed to permit a path way for heat dissipation. Whereas, Romijn and Lokhorst (1953), noticed a short period of moulting by feeding sea weed

TABLE 3. The effects of treatments on feather weight of different growth rates.

Growth rate	Treatment	Feather weight (g)	
		Cockerels	Pullets
High	I	58	42
	II	58	35
	III	62	42
	IV	60	35
	V	38	33
Medium	I	62	47
	II	58	38
	III	43	31
	IV	44	30
	V	38	23
	VI	40	50
	VII	45	37
	VIII	58	35
	IX	47	23
	X	53	42
	XI	38	33
Low	I	33	47
	II	33	32
	III	40	35
	IV	37	32
	V	37	25

meal which contains iodine. However, all the other treated birds showed an increase in their feathers weight. This study may suggest that feather moult occurred early in the beginning of the treatment which was followed by a high wave of feather renewal causing this increase of feather weight. This also, explained the increase in feathers of the corrected hypothyroidism birds by the thyroid substance in this study or in the study of Winchester *et al.* (1949). When they injected thyroxine to the completely destructed thyroid birds.

TABLE 4. Analysis of variance for feather weight as influenced by different treatments and sexes for the different growth rates.

Growth rate	Degree of freedom			Mean square		
	Error	Sex	Treat.	Error	Sex	Treatment
High	24	1	4	61.87	5723.34**	84.58
Medium	56	10	10	197.88	2656.25**	392.54**
Low	24	1	4	168.19	30.00*	83.33

\*Significant at 5% level of probability.

\*\*Significant at 1% level of probability.

## References

- Boone, M.A., Reincke, E.P. and Davidson, J.A. (1947) The relation of thyroid activity to feathering in two strains of Rhode Island Reds. *Poult. Sci.* 26, 533.
- Irwin, M.R., Reincke, E.P. and Turner, C.W. (1943) Effect of feeding thyroactive iodocasein on growth feathering, and weights of the glands of young chicks. *Poult. Sci.* 22, 374.
- Romijn, C. and Lokhorst, W. (1953) The influence of iodine on the physiological activity of the fowl. *Diegenask* 78, 369.
- Stukie, P.D. (1954,1958) "Avian Physiology," Comstock Publ. Ass. Ithaca N.Y., U.S.A.
- Sulman, F. and Perck, M. (1947) Influence of thiouracil on the basal metabolic rate and moulting in hens. *Endocrinology*, 41, 514.
- Turner, C.W., Irwin, M.R. and Reincke, E.P. (1945) The effect of the thyroid hormones on egg production white Leghorn. *Poult. Sci.* 24, 171.
- Voitkevich, A.A. and Kostin, I.A. (1947) The reaction of feather forming tissue to variation in the activity of the thyroid gland induced by thiouracil injection. *Bull. Cksp. Biol.*, 24, 161.
- Weeler, R.S., Hoffmann, E. and Graham, C.L. (1948) The value of thyroprotein in starting, growing and laying rations. II. The growing period, 12-24 weeks of age. *Poult. Sci.* 27, 509.
- Winchester, C.T., Comer, C.L. and Davis, G.K. (1949) Thyroid destruction by  $I^{131}$  and replacement therapy. *Science*, 110, 302.

## تأثير اليود والغده الدرقيه على الانتاج والتناسل في الدجاج • الجزء السادس : التريش

محمد جمال الدين قهر و محمدى عبد الحسين محمد سعيد الملا حسن

قسم الانتاج الحيوانى ، كلية الزراعة ، جامعة القاهرة

أعطيت الكتاكيت فى سن ١٨ أسبوع جرعات من الغده الدرقيه واليود بنسب  
مختلفة وقد أدى ذلك الى زيادة معنوية فى وزن الريش المطلق والمنسوب  
لوزن الجسم للطيور المعاملة •