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THE POTENTIAL BROODY INTENSITY OF NATIVE CHICKS IN TAIWAN[1]

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ABSTRACT

Data collected from an experiment including five cockerels and five pullets indicated that cockerels needed a larger amount of ovine prolactin to induce broodiness, there was a great variation in potential broody intensity between pullets, and the broody response to prolactin treatment may be used to differentiate the potential broody intensity of sex unmatured chickens.

Broodiness is brought about by more than one independent autosomal gene (1) or in addition to the autosomal genes by a sex-linked gene (2, 3), and may be induced physiologically by injection of proplactin (4-7). It is probable that the physiological function of the genes for broodiness lies in their ability to regulate the rate at which the pituitary gland secretes prolactin. Nalbandov *et al.* (5) demonstrated that the amount of prolactin required to induce broodiness in the cocks was proportional to the potential intensity of broodiness provided for by the genic makeup of cocks. Evidently, there is a close relationship between the potential broodiness and the amount of prolactin injected for the physiological induction of broodiness. Native hens in Taiwan usually exhibit broodiness after laying 10 or more eggs and thereby lay less eggs per biological year than non-broody breeds do. Consequently, the study of the potential broody intensity of native young chicks would have some special meaning either in the selection of native hens against broodiness or in the understanding of the nature of broodiness.

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MATERIALS AND METHODS

I. *Recognition of Broodiness*

According to Riddle *et al.* (6), the full expression of broodiness of the sexually matured hens should include clucking and nesting after the injection of prolactin. The sexually unmatured chicks can not make sounds comparable to that of the adult hens, but their sounds are well understood by the chicks, as was shown by answering the feed call and crouching when the danger signal was uttered (8). Consequently, any indication of clucking, nesting, or taking care of the chicks from the prolactin treated chicks will be considered as the expression of broodiness.

II. *Criterion of Broody Intensity*

According to Nalbandov *et al.* (4, 5), the amount of prolactin to produce broodiness

is inversely proportional to the potential intensity of broodiness. The criterion of broody intensity in this experiment is therefore determined by the amount of prolactin required to produce broodiness in the chickens. If a larger amount of prolactin is required to produce broodiness, the potential broody intensity of the chicken is weak. Otherwise, the potential broody intensity is strong. On account of the limited supply of prolactin, a criterion of broody intensity for cockerels was arbitrarily set up at the level of 600 I. U. of ovine prolactin injected. Cockerels required 600 I. U. or less of ovine prolactin to produce broodiness were considered to have a strong potenital broody intensity. Above that level, they had a weak potential broody intensity.

Five native cockerels and five native pullets of five months old were used in this experiment. They were kept in the individual cages in a semi-darked room and fed with the laying feed from the Taiwan Sugar Company. Two weeks later, each bird was begun to be intramuscularly injected with 150 I. U. of ovine prolactin* daily until the treated bird began to brood or meet the requirements of this experiment. Feed and water were given *ad libitum* throughout the experiment.

RESULTS AND DISCUSSION

Results obtained from this experiment are shown in TABLE I. Those pullets with broody response to ovine prolactin treatment were able to cluck, nest, and /or take care of chicks (*Figs. 1-3*). The pullets with

TABLE I.

The broody response of native sexually unmatured chicks to prolactin treatment

Chick number	Sex	Body wt (Gm)	Total dose of prolactin (I. U.)	Plumage color	Broody response			Remarks
					Clucking	Nesting	Taking care of chicks	
161	F	527	450	Black	+	+	+	Nesting lasted for 18 days
1092	F	1100	150	Black, but feathers in the neck were silver-laced	+	+	+	Nesting lasted for 12 days
168	F	1250	300	Black, but feathers in the neck were red	+	+	+	Nesting lasted for 10 days
1052	F	750	450	Yellow	+	−	−	
1064	F	1500	450	Yellow	+	+	−	Nesting lasted for 3 days
1053	M	1000	600	Black, spangled with yellow or red	−	−	−	
1075	M	1200	600	Barred	−	−	−	
1051	M	1520	600	Black; feathers in the neck, back and breast were spangled with red	+	−	−	
1060	M	1895	600	Barred, spangled with yellow	+	−	−	
1061	M	1370	600	Red, but feathers in the tail and wings were black	−	−	−	

* Kindlyy donated by Dr. J. D. Fisher, Armuor Pharmaceutical Company, Illinois, U.S.A.

broody response did nest but they could not incubate eggs as well as the hens. They did not care the eggs too much and usually broke the eggs when they were transfered from the individual cage to the broody nest with eggs. The cockerels with broody response were able to cluck only.

The genetic composition of the native chicks was quite different from one to another. This could be seen in the great variation in the feather color and body weight between any two chicks. Consequently, it should not be surprised that there was a great variation in the broody response to prolactin treament in pullets. On the basis of the amount of ovine prolactin used and the intensity of broody response, pullets 1052 and 1064 and cockerels 1083, 1075, and 1060 should have a less broody intensity. Generally, cockerels needed a larger amount of prolactin to produce broodiness. This might be due to the fact that male chicks are genetically homozygotes while female chicks are heterozygotes.

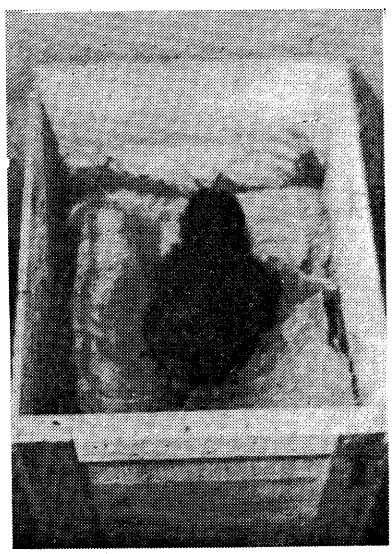

Fig. 1. Pullet 1092 in nesting

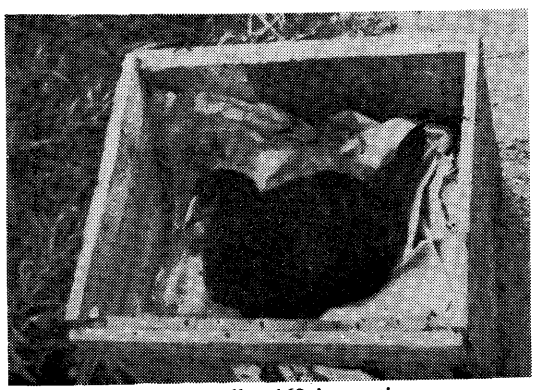

Fig. 2. Pullet 168 in nesting

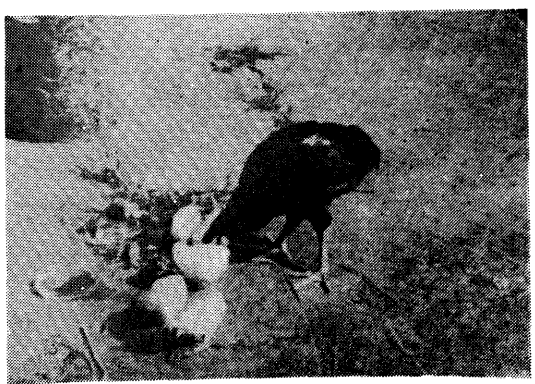

Fig. 3. Pullet 161 in taking care of chicks

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