

THE EFFECT OF SUBCUTANEOUSLY INJECTED PROGESTERONE ON MOLTING AND SUBSEQUENT EGG PRODUCTION OF CHICKENS¹

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Domesticated chickens normally molt their feathers each fall, toward the end of the egg production season. Since the processes involved in molting are usually incompatible with egg production, the time and rate of molting in chickens are of interest to the poultry investigator.

Force molting of laying hens means to induce the birds to molt at a time other than they normally would. Card (1) states that one objective for the use of force molting of laying hens is to bring about an early molt so hens can get back into production before the seasonal advance in egg prices during the fall months. Force molting has been accomplished by radical changes in the light period or by feed and/or water restriction. Failure of hens force molted by these methods to return to a satisfactory level of production in many instances has discouraged its use.

Several workers have reported that various materials will induce molting when given to hens. Van der Meulen (2) reported that the administration of desiccated thyroid substances to hens caused molting. The drug Enheptin (2-amino, 5-nitrothiozole) was reported by Pino (3) to cause molting when fed to laying hens. Shaffner (4), Herrick and Adams (5), Adams (6, 7), and Himeno and Tanabe (8) demonstrated that injecting the gonadal hormone progesterone into laying chickens caused a cessation of egg production followed by a molt. Adams (7) observed that subcutaneous injections of progesterone were more effective in suppressing egg production and stimulating molt in hens than intramuscular or oral administration. The probable action of progesterone on molting is thoroughly discussed by Himeno and Tanabe (8).

The following experiments were designed to study the effect progesterone would have on hens which were approaching or had started their natural molt.

EXPERIMENTAL

The first trial involved Single Comb White Leghorn hens and was started on July 3, 1957. These hens had been placed on a nutri-

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tional study in individual cages during August 1956 and had been in production since that time. During the course of the experiment the birds continued to be housed in individual cages but were moved to different cages to facilitate record keeping.

At the start of the experiment and every fourteen days thereafter, all the hens were individually examined for the presence of molt or low egg production. At the time of examination any hen which had started a primary wing molt or which had laid at the rate of 50 percent or less during the preceding 14-day period was randomly assigned to one of the four experimental groups. The four groups of six hens each received the following dosages of progesterone via subcutaneous injection in the upper neck region: Group 1, control—no progesterone; Group 2, four injections of 25 mg. each, 14 days apart; Group 3, Two injections of 50 mg. each, 28 days apart; and Group 4, a single injection of 50 mg. The initial progesterone injection was administered to the hens at the time they were placed in the experiment.

A second trial, started August 1, 1958, used a meat-type strain of White Plymouth Rock hens. These hens had been placed on a nutritional study in floor pens during September 1957 and had been in production since that time. At the start of the experiment, 26 hens were chosen at random and injected subcutaneously in the upper neck region with 50 mg. of progesterone each. The 27 remaining hens received no progesterone and served as the controls.

The old primary wing, secondary wing, and main tail feathers of each bird were counted when the birds were placed on the experiments and at regular intervals throughout the experiments. In presenting the data, the degree of molt will be expressed as a percentage of the old feathers missing which were present at the time the birds were placed on the experiments. Egg production, number of feathers missing, and mortality records were obtained.

RESULTS AND DISCUSSION

Molting. In both experiments the birds treated with progesterone exhibited a greater degree of molt in their primary wing, secondary wing, and main tail feathers than the control hens, Tables I and II.

Data in Table I, show that the differences in the degree of molt of the Single Comb White Leghorn hens receiving the various levels of progesterone were small (an exception was in the primary wing feathers of the birds receiving a single injection of 50 mg. of progesterone). These birds molted their primary wing feathers very slowly throughout the experiment. This is in agreement with the work of Harris and Shaffner (9) who reported that the trend was

for a heavier molt as the hormone level was increased or when given in two injections.

Data in Table II reveal that the differences in degree of molt between the White Plymouth Rock hens receiving progesterone and the controls were not as pronounced as in Experiment 1. As the data indicate, the control hens also molted a high percentage of their feathers. This increase is probably due to the fact the White Plymouth Rock hens were nearer to the natural molting period when placed on the experiment than were the Single Comb White Leghorn hens.

Egg Production. The data in Table III show that the levels of progesterone used in both experiments were very effective in suppressing egg production.

TABLE I

EFFECT OF PROGESTERONE ON MOLT OF SINGLE COMB WHITE LEGHORN HENS

(Based on number of old feathers present at the time the birds were placed on the experiment)

Treatment	Weeks After Initial Injection		
	4	8	10
	Percent of Feathers Missing		
	Primaries		
Control	5.5	14.8	16.6
BWI*	49.0	80.0	85.4
MI	59.5	85.7	88.0
SI	41.8	60.4	60.4
	Secondaries		
Control	15.4	19.0	20.2
BWI	70.8	98.7	98.7
MI	81.6	95.9	100.0
SI	75.0	96.6	96.6
	Main Tail		
Control	15.2	18.8	20.0
BWI	67.1	96.0	96.0
MI	79.6	100.0	100.0
SI	81.1	90.5	90.5

*BWI—4 injections of 25 mg. each, 14 days apart.

MI—2 injections of 50 mg. each, 28 days apart.

SI—a single 50 mg. injection.

TABLE II

EFFECT OF PROGESTERONE ON MOLT OF WHITE PLYMOUTH ROCK HENS

(Based on number of old feathers present at beginning of experiment)

Treatment	Weeks After Initial Injection		
	4	8	10
	Percent of Feathers Missing		
	Primaries		
Control	9	27	51
SI*	43	56	80
	Secondaries		
Control	9	21	57
SI	39	53	84
	Main Tail		
Control	11	25	84
SI	93	95	96

*SI—a single 50 mg. injection.

TABLE III

EFFECT OF PROGESTERONE ON EGG PRODUCTION

Breed	Treatment	Four Weeks Period Prior to Injection			
		Wks. After Initial Inj. 4	8	10	
S.C.W.L.	Control	45	37	46	43
	BWI*	40	0	0	0
	MI	31	0	0	0
	SI	28	0	15	64
W.P.R.	Control	44	36	31	21
	SI**	43	0	12	13

* See footnote 1, Table I.

** See footnote 1, Table II.

The Single Comb White Leghorn hens that received a single 50 mg. injection of progesterone attained a 64 percent level of egg production. The control group laid at a 43 percent level. Whether this level of production would have been greater than that of the birds receiving the other two treatments is not known since the experiment was terminated before the latter hens returned to egg production. The reverse effect was obtained with the White Plymouth Rock hens. Egg production of the hens which received a 50 mg. injection of progesterone was 13 percent compared to 21 percent for the control hens 10 weeks after injection.

SUMMARY

Studies were conducted to determine the effect varying levels of progesterone would have on the degree of molt and subsequent egg production when injected subcutaneously into Single Comb White Leghorn and a meat-type strain of White Plymouth Rock hens.

Four groups of Single Comb White Leghorn hens which had started to molt or were laying at a low rate were injected with progesterone as follows: Group 1, control; Group 2, four injections of 25 mg. each, 14 days apart; Group 3, two injections of 50 mg. each, 28 days apart; and Group 4, a single injection of 50 mg. A second experiment was conducted consisting of White Plymouth Rock hens which received a single injection of 50 mg. of progesterone. In all cases the initial injections were made when the birds were placed on the experiment. Records of egg production, number of missing feathers, and mortality records were obtained.

When compared to the control hens, all levels of progesterone used were effective in suppressing egg production and inducing a more nearly complete molt, particularly in the secondary wing and main tail feathers. The Single Comb White Leghorn hens which received a single injection of 50 mg. progesterone were laying at a higher rate than the control hens 10 weeks after injection.

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