V. PREFERENTIAL MATING OF FOWLS

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(With observations on the time of day when males exhibit greatest sexual activity.)

The problem of obtaining fertile eggs for hatching purposes is of great economic importance to poultrymen and hatcherymen. As one phase of this problem this question arises, "In a breeding flock of poultry, do males have a preference as to which female they will mate?" If preference is shown this may account for some of the infertile eggs that are obtained when one male is mated with a number of females.

Little literature has been found reporting work on preferential mating in fowls. Philips (1918) and (1919) reports the results of several tests conducted with various breeds for periods of one to four days each. Observations in the first test at this station were made April 15, 17 and 19. The observations began at daylight and continued until the birds went to roost in the evening. The male bird was removed the night preceding each observation and was placed in the pen at daybreak. It was deemed advisable to do this to avoid the possible

TABLE I

Copulations by Days and Individuals

Leg Band No.	Number of Copulations 1st Day	2nd Day	3rd Day	Total	Copulations Ave. No. Per Day	Egg Record for 5½ Monhts
2525	2	1	1	4	1.33	52
2526	2	0	2	4	1.33	72
2527	0	0	0	0	0.00	15
2528	2	2	1	5	1.66	86
2529	4	0	1	5	1.66	75
2530	1	3	0	4	1.33	61
2531	0	1	1	2	.66	65
2532	2	3	1	6	2.0	66
2533	3	2	1	6	2.0	102
2534	1	3	2	6	2.0	68
2536	1	2	1	4	1.33	88
2538	1	1	1	3	1.0	86
2539	3	2	2	7	2.33	39
2642	1	4	0	5	1.66	37
2661	3	1	1	5	1.66	66
Totals	26	25	15	66	1.46	

error of omitting early morning copulations. Fifteen pullets and one cockerel of the S. C. White Leghorn breed were used in these observations. A record was kept of each copulation made and the time at which it occurred. The females were identified by differently colored legbands to avoid the necessity of catching them after each copulation. In this way, pratically normal conditions prevailed in the pen.

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Several interesting figures appear in Table I. It may be noted that the number of copulations with the various females for the three days ranged from no copulations with hen 2527 to seven copulations with hen 2539. Hen 2527 was not in production at the time of this test. Considerable irregularity is shown in the number of copulations for the various days with the same individuals. Examples hens 2526, 2529, 2530, 2642. The average number of copulations per bird per day varied from 0.0 to 2.3. The average number of copulations per bird, per day all birds considered was 1.46. There was no apparent relationship between the number of copulations and egg production for the preceeding 5½ months.

TABLE II.

Time of Copulations by Days.

Period	Time	1st Day	2nd Day	3rd Day	Total	Average
1	Daylight to 10:30 A. M.	4	3	2	9	3.0
2	10:31 A. M. to 1:30 P. M.	3	1	4	8	2.6
3	1:31 P. M. to 3:30 P. M.	4	5	0	9	3.0
4	3:31 P. M. to dark, (about 6:30 P. M.)	15	16	9	40	13.3
Total Per Day		26	25	15	66	Ave. 22.0
% Activity in Period 4		57.6	64.0	60.		60.6

Table II gives the number of copulations for 4 periods of the day divided as follows: dayight to 10:30 a. m.; 10:31 to 1:30 p. m.; 1:31 p. m. to 3:30 p. m; 3:31 p. m. to roosting time (about 6:30 p. m.). The period of greatest activity each day was from 3:31 p. m. to dark. In each case approximately 60 per cent of the total copulations for the day occurred during the period from 3:31 p. m. to dark. The other three periods of the day show practically equal activity for the three days considered collectively although the individual days show considerable variation.

Table No. III shows the number of copulations occuring with each bird for each day together with totals and averages for the same. The total number of copulations per bird differed greatly for the various individuals. The greatest number of copulations was 59 in the case of bird No. 2554 and the least number was 4 with bird No. 2536. The total number of copulations for the 16 day period was 276, an average of 17.25 per day or an average of 18.4 per bird for the entire period. The average number of copulations per bird per day was 1.15. The number of copulations varied from 6 to 27 per day during this test. Temperature is believed to be partially responsible for the difference in daily activity of the male in this test e. g. July 1 when only 6 copulations occurred was an extremely warm day, also the last week was warmer than the first part of the test. The greatest number of copulations with one bird in one day (8) occurred on

TABLE III

Number of Copulations by Days

Leg Band	June 16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	14	.87
2532																	17	1.06
2533	1	1	0	0	1	1	2	0	1	0	2	0	0	0	1	0	16	1.00
2530	5	0	0	1	2	0	0	0	2	0	1	0	0	0	2	1	14	.87
2534	1	2	2	2	2	2	2	1	2	0	1	0	0	0	0	0	11	Average
2536	1	1	4	0	0	2	0	2	1	0	0	1	1	0	0	2	Total	Per Day
Number	7	3	1	1	1	0	0	1	0	0	0	0	0	0	0	0	Bird	.68
2526	0	0	0	0	1	0	2	0	1	1	3	1	0	0	1	1	10	.62
2527	1	6	8	3	1	5	5	7	3	2	5	3	1	5	4	0	4	.25
2529	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	1	29	1.81
2538	0	1	1	2	2	2	3	2	1	2	3	1	3	4	2	0	10	.62
2545	2	1	1	1	0	0	2	1	1	0	0	0	1	0	0	0	21	1.31
2548	0	3	1	2	4	2	4	1	2	0	0	1	0	0	1	0	20	1.25
2549	1	2	2	1	1	1	3	2	2	0	1	0	2	1	1	0	9	.46
2553	0	0	1	0	1	1	0	1	0	2	0	0	0	0	2	1	23	1.43
2554	0	0	3	1	2	1	1	5	3	0	1	1	1	1	3	0	19	1.18
2642	1	1	3	0	1	2	1	0	2	0	0	1	1	2	3	0	59	3.68
Total Per Day	20	22	27	14	19	20	25	23	22	8	17	9	10	13	21	6	276	Grand Tot.
Ave. Per bird per day		1.33	1.46	1.80	.93	1.26	1.66	1.53	1.46	.53	1.13	.60	.66	.86	1.40	.40	1.15	

June 18, and was with bird 2534. This is the female with which the male had the greatest number of copulations for the entire test. (59 or an average of 3.68 per day). The male copulated one or more times with 2534 on every day of the test except on Juy 1, the last day of the test. It is interesting to note that the greatest number of copulations for twelve of the sixteen days of the test was with 2534. This female was undoubtedly a favorite with the male used. Bird No. 2538 was copulated with 29 times during the test, with only two days on which no copulation occurred. Copulations occurred with No. 2449 a total of 20 times and on all except 3 days of the test; No's. 2554 and 2642 were each copulated with on all but 4 days, two more on 7 days, and three more on eight days. The longest period with no copulation recorded was of 8 consecutive days duration with bird No. 2532. Periods of 6 days and 5 days occurred with two other individuals.

TABLE IV

TIME OF COPULATIONS

Leg Band	Periods of Day A. M. 6-9;	9:01-12 M	P. M. 12:01-3;	3:01-Dark	Tot. No. Cop.	Egg Record Prev. Nov. 1— 3 weeks	June 24
2526	2:	1:	3:	4:	10	10 Eggs	123 Eggs
2527	7:	2:	3:	2:	14	11	77
2529	2:	5:	2:	8:	17	18	128
2530	4:	4:	1:	7:	16	14	107
2532	9:	0:	2:	3:	14	15	118
2533	3:	1:	1:	6:	11	8:	151
2534	15:	8:	11:	25:	59	16:	118
2536	3:	0:	0:	1:	4:	11:	129
2538	10:	4:	4:	11:	29	7:	129
2545	3:	3:	0:	4:	10	15:	134
2548	6:	3:	2:	10:	21	17:	137
2549	4:	2:	5:	9:	20	8:	89
2553	3:	1:	0:	5:	9	19:	130
2554	4:	2:	3:	14:	23	16:	114
2642	3:	2:	1:	13:	19	8:	92
Total Cop.	78:	38:	38:	122	276	Tot. 193	Tot. 1776
Ave. Cop. Per bird	5.2	2.5	2.5	8.1	18.4	Av. 12.8	Av. 118.5
Per Ct. Cop. each per.	28.26	13.76	13.76	44.20	100.00		

Philips (1919) states, "The tendency seemed to be for the hens to be mated several times per day or not at all." This tendency is not noticeable in table No. III. Some individuals were mated with only once or twice daily for practically the entire test while with others wide daily flunctions are shown.

Table No. IV, gives the number of copulations that occurred during various periods of the day with the different females, the total number of copulations per bird, the egg production for 7½ months previous to the test, and the egg production for 3 weeks previous to the test are also given. The day was divided into periods similar to those of the first test, but the limit hours of each period were changed somewhat. The first period of the day extended from 6 a. m. to 9 a. m.; second period 9:01 a. m. to 12 M.; third period 12:01 p. m to 3:00 p. m.; fourth period 3:01 p. m. until roosting time, approximately 7:30 p. m.

Table No. IV shows plainly that the period from 3:01 p. m. to dark was by far the period of greatest activity on the part of the male (122 or 44.20% of total copulations). This is in agreement with the work of Philips (1919), although in a preliminary test (1918) he obtained practically equal activity throughout the day. The period from 6 to 9 a. m. was next in order of activity; 79 copulations or 28.26% of the total number occurring during this period; of the two remaining periods, 38 copulations or 13.76% occurred during each. Twelve of the fifteen females were copulated with most often during the 4th period of the day and the remaining three during the last period of the day. No apparent relationship existed between number of eggs laid and the number of copulations that occurred.

Summary

In both tests appreciable variation in number of copulations with the different individuals resulted. In the first test (the 3 days observation) only one pullet was entirely ignored and she was not laying at the time of the test. In the second test no pullet was entirely omitted. The lowest number of copulations for the 16 day observation was 4. Three birds registered no copulations for 5 to 8 consecutive days, and several others for 3 or 4 days, consecutively. The fact that fertility ordinarily remains normal for ten days to two weeks after the removal of the male bird has been demonstrated by several workers and is generally known to poultrymen. It may be said that no decreased fertility would have resulted from the fewest copulations recorded in this test. This is providing all copulations were successful and that spermatozoa were deposited in each case. Penquite and Craft (1927) and Martin and Anderson (1918) fond that fertility decreased rapidly or ceased entirely after ten copulations in one day.

The great variation in number of copulations with the different females indicates that it was not mere chance that this occurred. Apparently definite preference was shown for certain hens. Phi'ips (1919) after making several tests of short duration with various breeds concluded that the difference in number of copulations by the male was due to the actions of the hens rather than to a preference of the male. Observations in the present test do not bear this out entirely. Several cases were noted where the hens were with the male i. e. (following him about) a great deal and yet were not mated with so often as were some other hens that were not with him so often. It is generally recognized that hens that are out of production

i. e. broody hens, molting hens, immature pullets, etc., will often repulse the male. It is possible that certain hens that are laying will likewise repulse certain males. Regardless of whether the male bird or the hen is responsible, it is evident that the great differences in mating of the individuals occurred in these tests. It is also easy to surmise that lowered fertility of certain individuals might result from the cause of individual preference. Much more exhaustive tests should be conducted before definite conclusions are drawn.

The period of the greatest sexual activity of the male bird was from 3 p. m. until dark. It is possible that the time of year the observations were made might affect this although similar results were obtained in the April and June observations, and the work of Philips (1919) is in agreement with this. Apparently no relationship existed between previous egg record and number of copulations.

No conclusions are attempted from the meager data given, but it is hoped these preliminary tests may lead to further work along this line. These tests merely suggest that preferential mating may be a contributing cause to poor fertility from certain individuals. This paper may also call attention to how extensive the field is for further work on the problem of fertility and factors affecting it.

LITERATURE CITED

Martin, J. H. and W. S. Anderson (1918), The results of single, one day matings. Jour. A. A. of I. and I. in P. H. 22-23.

Philips, A. G. (1918), A brief study of the mating habits of fowls with a test of the value of a single mating. Jour. A. A. of I. and I. in P. H. 4:4: 30-31.

Philips, A. G., Preferential mating of fowls, Jour. A. A. of I. and I. in P. H. 5:4:28-30.

Penquite, Robt and W. A. Craft (1927), Unpublished data on Observations on Activity and Fertility of White Leghorn males.