The Stimulation Time for Copulation in Purposeful Strange Matings of House Pigeons (Columba Livia L.)

by

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ABSTRACT

THE purposeful strange matings of house pigeons involved pairing 24 female and 24 male racing pigeons in special nesting cells which prevented purposeless matings. However, only 4 of the males (elites) were allowed to mate (service) with the 24 female pigeons—a mating ratio of 1 : 6. There were altogether 277 attempted matings in four laying periods. Out of this number 151 resulted in successful copulations (matings) whereas 126 resulted in unsuccessful matings (copulations). Successful matings (N=151) occurred between one to 35 minutes whereas the unsuccessful matings (N=126) were observed between 5 to 58 minutes. It was specifically found that over 90% of all successful copulations came within 5 minutes of introduction of female pigeons to strange elite male pigeons. 5 minutes appeared then to be the optimum time of stimulation among pigeons under purposeful strange matings.

INTRODUCTION

Pigeons are by nature monogamously mating birds. A pair of mating pigeons may maintain its pair bond for life (Whitman, C. O. 1919). Under monogamy a pigeon breeder cannot mate the best to the best and cannot as a matter of fact know precisely when the pair mated and how long it took the pair to stimulate themselves to copulation. To obtain such information and to apply also population genetics' techniques on pigeon breeding populations, it became necessary to think of novel methods to polygamize pigeons. Beuing (1971), Beuing (1973), Nwosu and Beuing (1973) have introduced theory coupled with actual experimentation to show that polygamous matings of pigeons are possible through biotechnical means. The mating behaviour of pigeons, which include pair formation, waltz courts of the males and crunching for mating by female pigeons, nesting courts, and egg laying behaviours, has been fully treated in literature by the following researchers (Whitman, C. O. 1919; Carpenter, C. R. 1933; Heinroth, O. and Heinroth Kathe 1949; Fabricius, E and Jansson, A. 1963).

The female pigeon does not lay spontaneously and continuously like the house fowl. In this polygamising experiment using a purposeful strange mating method, the main objective was to use *any* male to stimulate a female pigeon by the use of special nesting cells to achieve the ripening of the oviducial egg and ovulation but use *elite* males for controlled (purposeful) matings.

MATERIALS AND METHODS

Altogether 24 male pigeons and 24 female pigeons were used for the purposeful strange mating experiment. All pigeons were of the type used for flying contests and were about 9 months old at the start. The first phase of the experiment started on 31. 6. 73. After this period of synchronisation-pairing, three other mating periods were made. Out of 24 male pigeons, only four were selected as elite males based on their flying records. Although 24 pairs of pigeons were housed in the special nesting cells for about 5 days (purposeless matings

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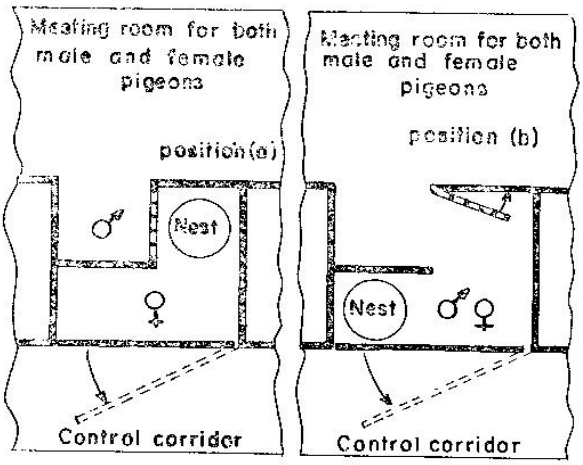
were eliminated) only the 4 elite males were used as breeders after 5 days. To each elite male, 6 female pigeons were introduced to him sequentially after 30 minutes intervals for mating (service) -a mating ratio of one male to 6 female pigeons. The objective of a 1 : 1 ratio at the start is to get partners mutually stimulate themselves to egg formation without necessarily having a sexual act among themselves. Only the elite males N=4) were the flock male pigeons. Several attempts at matings were observed carefully from a corner of the mating pen(s). A successful mating was one in which copulation was observed between one to 35 minutes whereas an unsuccessful mating was one in which *no* copulation or *Some* serious fighting was observed between 5 to 58 minutes.

The structure of the nesting cells (N= 24) used in the purposeful strange matings of pigeons is shown on figure 1. Each cell measured 64X64cm; $\frac{3}{4}$ of which served as confinement section for the female pigeon and was separated with a wire gauze from the other $\frac{1}{4}$ of the cell serving as action space for-the male. The female pigeon was released (position "b") at the early morning of the day she would lay her second egg. Position "a" of fig. 1. shows the wire gauze still closed at the confinement stage. The male partner moved about freely in the meeting room without, of course, having sexual access to the female. During the period of confinement of the female, laying nests and small feed and water containers were placed at the disposal of the confined females. Meanwhile all the males ate and drank from common troughs at the floor of the meeting room. Both male and female pigeons fed ad libitum and on Hessen pigeon ration containing 15% protein. With this arrangement a male pigeon can caress bill and make waltz courts to the confined female without having access to mount the female pigeon. This stimulation through sight, touch and hearing played an essential part in getting the female pigeon to eventually lay an egg under these mating conditions. Without such stimulation, a female pigeon cannot lay any eggs spontaneously.

FIGURE 1

NEST CELL FOR PURPOSEFUL STRANGE MATING



On the fifth day of pairing at sight, the experimental pigeon females were mated with elite male pigeons. For the mating exercise, a special mating stall measuring 1·5m x 2m was used. No perches, no feeding nor watering troughs were provided at the mating stall to avoid any destractions. A male pigeon was put in the mating pen and the females alloted to him at random were brought singly to him. A stop watch was used from a hiding place to record the time required by both male and female pigeons to stimulate themselves reciprocally to actual copulation or non-copulation. An elite male pigeon came in contact with a female pigeon at a time in the mating pen. The same elite male pigeon got another turn with another female pigeon after 30 minutes. At the end, the elite male pigeon must have tried all by himself to mate 6 female pigeons (a ratio of 1 : 6). Another elite male repeated the performance (1 : 6) etc. until all 4 elite males have had their turns and all 24 female pigeons must have been "mated". After the eggs have been laid, artificial eggs were laid under the pigeons for brooding while the natural eggs were incubated and tested for fertility.

After about 10 days brooding, all the gypsum eggs were removed and new pairing begun. Altogether four mating periods (P_1, P_2, P_3, P_4,) accompanied by synchronisations of the reproductive cycles were made.

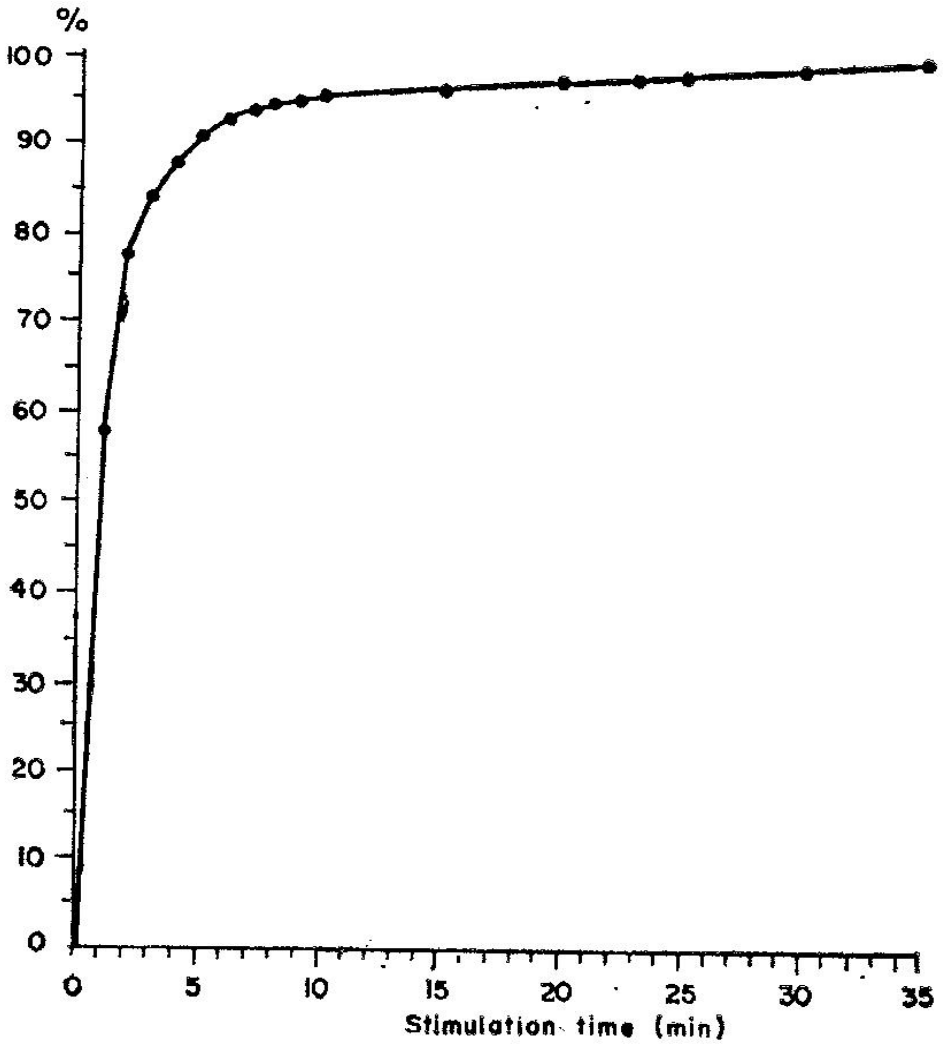
RESULTS

The objective paramcter used to judge the mating willingness of both the male and female pigeons was the time needed to stimulate the pair to actual copulation. When a female pigeon was introduced into a mating pen, the strange male immediately waltz-courted the strange female, which accepted or declined mating depending on the level of her stimulation. The time required by both to copulate was known as stimulation time for copulation.

FIGURE 2

STIMULATION TIME FOR SUCCESSFUL MATINGS

(Summing percentage distribution of all values)



Out of a total 277 attempted matings for all 4 periods (N=4), 151 resulted in isuccessful copulations whereas 126 resulted in unsuccessful matings (Copulations). Table 1 gives the *simple* percentage success per mating period whereas figure 2 is a statistical proceedure giving the *cumulative* percentage success among all the successful copulations which indicated the optimum stimulation time to be 5 minutes. Consequently, in an entire population of successfully mating pigeons (N=151) it was found that about 90% of all successful copulations occured within 5 minutes of introduction of the female to the male in a mating pen Figure 2. did not at all take into consideration the unsuccessful matings since there was really no time limit to the unsuccessfulness of the expected mating.

From Table 1, there appearcd an increase in the rate of unsuccessful matings from the first to the last period. A chi-square test has been used to test this increase. It was found that the apparent increase in unsuccessful matings as the periods increased was not significant at 5% level.

Table 3, gives the mean reaction (stimulation) time for only the successful matings per period.

The mean reaction time for copulation tended to decreasc with increase in the mating period. A Chi-Square test is used to test the significance of this observation.

TABLE 1

% Successful Copulations je Period

Period	*'Attempted' Matings*	*'Successful' Copulations*	*Success %*	*'Un-successul' matings*	*Non-Success %*
P1	69	42	61	27	39
P2	67	41	61	26	39
P3	69	39	57	30	43
P4	72	29	40	43	60
	'277'	151	' '	126'	

TABLE 2

Chi-square Test for Unsuccessful Matings

MATING PERIOD:	1	2	3	4
Observed(o)	27	26	43	
expected(e)	31·5	31·5	31·5	31·5
Deviation(d)	(—4·5)	(—5·5)	(—1·5)	(—11·5)
	0·64	0·96	0·07	4·20

$X^2 = \frac{d^2}{\left(\frac{(o-e)2}{e}\right)}$ 5·87 P 0·05

TABLE 3

Mean Stimulation Time je Period for Successful Mating

Periods	*Mean stimulation Time (mins)*
P1	4·10
P2	3·25
P3	2·51
P4	1·41

TABLE 4

Chi-square Test for Mean Reaction Time for Successful Matings

MATING PERIOD:	1	2	3	4
o	4·10	3·25	2·51	1·41
e	2·95	2·95	2·95	2·95
d	(+1·15)	(+0·30)	(-0·44)	(-1·54)
d^2				
-	0·45	0·03	0·07	0·80
e				
$\chi^2 = 1·35$			$P \geq 0·05$	

DISCUSSION

The purposeful strange matings of house pigeons proved to be an effective way of polygamising them because a male pigeon, according to the results, waltz-courted every female pigeon that was placed before him. Of all 277 attempted matings, 151(55%) ended up in successful copulations. Despite stronger monogamous tendencies, the female pigeons allowed themselves to be mated by strange males. The tendency of unsuccessful matings to increase with increase in the mating period proved not to be significant at 5% level. The level of effective pair formation and stimulation in the nesting cells seemed to influence the acceptance of a female by a male including the length of stimulation time for copulation. Above all, the purposeful strange mating method demanded that both mates be in the same stage of reproductive cycle. It was remarkable to note that as a result of 4 to 5 days of sexual starvation, made possible by separate keeping of the sexes but at the same time providing sight, auditory, and contact stimulation, it was possible to dissolve the barrier of monogamy.
Consequently strange males could within 5 minutes consumate copulations in cases of successful matings. The fact that over 90% of all successful copulations occurred within 5 minutes indicated that a stimulation time of 5 minutes was the optimum time in which two-to-copulate pigeons should be allowed to stay together.

If no copulations occurred within this time, another pair should be tried. The economic and practical significance of this finding was the saving in time during observations and the ability to mate pigeons by hand within a few days. Female pigeons adequately stimulated during the 5 days pairing period and sufficiently stimulated by a courting male in the mating pen crunched for mating and were actually mated within one minute of courtship.
Even though 5 minutes has been found to be the optimum time for copulation, the results showed a mean reaction time of 2·95 minutes to bring about a successful copulation.

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