THE INFLUENCE OF AGE ON REPRODUCTIVE CAPACITY IN C57BL MICE

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Summary. The influence of age on fertility was investigated in male and female C57/BL Icrf a⁺ mice, ranging in age from 1½ to 30 months. In males, the number of litters sired declined after about 24 months but there was no significant change in litter size. Most mice over 24 months old were sterile. The oldest male to sire a litter was 31 months old. The litter size in females followed the accepted pattern, declining from about 8 months: most mice were sterile by 12 months and the oldest mouse to produce a litter was 16 months old.

The decline in fertility with increasing age in the female is well established (e.g. Jones & Krohn, 1961) but there is little information on the effects of age on breeding performance in the male. Although there is some evidence of declining fertility in bulls (Bishop, Campbell, Hancock & Walton, 1954), Finn (1964), using a non-inbred mouse strain (TO) found that the age of the sire had no significant effect on fertility as measured by litter size. In the present paper, the effects of age on the number of litters and on litter size in a colony of ageing mice are described.

The mice used were C57/BL Icrf a⁺, a mutant sub-line of C57BL mice established by Craigie (personal communication) in 1958 and since maintained in the ICRF laboratories. The mice were housed in pairs in an artificially lighted room (12 hr light and 12 hr darkness) and fed on a commercial pelleted diet (GR/R/3EK, Dixon's, Ware). Tap water was freely available. Five groups of males, 5, 18, 20, 24 and 30 months old, were used. Each was paired with a female of proved fertility. If the female died or became ill, it was replaced. The ages of the fifty-one females used ranged from 6 weeks to 7 months (eleven were 6 weeks old, seven were 3 months old, twenty-two were 4 months old and eleven were 5 to 7 months old). Three additional groups, each of six females aged 10, 17 and 25 months, were also used. These were paired with males of proved fertility, aged 7 months.

The results are given in Tables 1 and 2. Table 1 gives litter size, number of litters and interval between litters for each group of males. To avoid the possible effects of declining fertility in the female, only the figures for the first 4 months of the breeding period are given. Litter size was not influenced by season. The oldest male to sire a litter was 31 months of age. Table 2 gives the litter size by

age for females. All females were proved fertile before being taken into the experiment. By 10 months of age, two of six females were infertile and the oldest mouse to produce a litter was 16 months of age. All fifteen mice tested above this age were sterile.

The decline in reproductive capacity with age in the female is again confirmed by this experiment. The most significant findings in the male are that most mice

TABLE 1
BREEDING CAPACITY IN 4 MONTHS, OF MALE MICE BY AGE

<i>Age group and No. of mice</i>	<i>No. of litters</i>	<i>Mean no. breeding male $\pm$ S.E.</i>	<i>Mean litter size $\pm$ S.E.</i>	<i>Mean interval (days) $\pm$ S.E.</i>
5 Months, eleven mice (one infertile)	28	2.8 ± 0.3	6.3 ± 0.5	33.7 ± 1.7
18 Months, seven mice (none infertile)	22	3.2 ± 0.3	5.9 ± 0.4	34.2 ± 4.3
20 Months, five mice (none infertile)	14	2.8 ± 0.6	6.6 ± 0.6	34.5 ± 2.8
24 Months, six mice (four infertile)	3	1.5 ± 0.5	7.3 ± 0.7	54.0 ± 11.7
30 Months, six mice (all infertile)	0	0	0	0

TABLE 2
AGE AND MEAN LITTER SIZE FOR FORTY
BREEDING FEMALES

<i>Age group (months)</i>	<i>No. litters</i>	<i>Mean litter size $\pm$ S.E.</i>
3	7	3.4 ± 0.4
4	13	5.6 ± 0.5
5	20	7.2 ± 0.4
6	23	6.6 ± 0.5
7	22	6.5 ± 0.5
8	11	4.8 ± 0.6
9	5	3.2 ± 0.4
10	8	4.5 ± 0.9
11	8	4.1 ± 0.5
12	3	2.3 ± 0.3
16	1	2.0

over 24 months of age are infertile and that, in those mice which do breed, there is an increasing interval between litters. Preliminary histological studies of the testes in old mice (in preparation), as in the series described by Finn (1964), have shown that spermatogenesis was still occurring although the number of atrophic tubules in each testis increased with age. It seems likely that male infertility may be due to physical incapacity rather than to a true reduction in the fertilizing power of spermatozoa from aged animals, but this has not been proved. Seasonal variations do not seem to have affected breeding capacity in these experiments.

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