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Telephone: NEWington 1081

16.Oct.63

Dear Dr. Szilard,

I feel it would be rather difficult to lay on a special "ageing" experiment with rabbits here. The stocks are heavily committed to other work, though I will most certainly keep in mind the possibility of superimposing an "ageing" experiment on some breeding work. We dare not import stocks from outside; every time we have done this in the past, an epidemic of one kind or another has broken out. But I have collected the following information relevant to your research aims.

1. I spoke to Dr. K.F. Kushner (Institute of Genetics of the Academy of Sciences, B. Kaluzhskaya 33, Moscow, U.S.S.R.). He said if you write he would be glad to send reprints on heterospermic insemination from his own Institute (including his 1954 review) and to send a bibliography that would be complete for his Institute but not complete for others.
2. You will now have had a bibliography from the Commonwealth Bureau of Animal Breeding. I am sorry they sent you an account for it by mistake, but gather this has now been cleared up.
- * 3. I enclose my own reprints relevant to your interests. The main one is "Fertility of mixed semen from different rabbits", J. Reprod. Fertil., 1, 1960, p.52. Here is information about ages. There were males A, B and C, respectively a Netherland Dwarf, a Flemish Giant, and C was of indeterminate breed. Approximate ages for Exps. 1-3 were respectively 15, 21 and 17 months, and for Exp. 4 males B and C were 32 and 28 months. Relative numbers of offspring ^{per sperm} over the whole experimental series were respectively 20:13:67. So there was no demonstrable relation between age and competitive ability, though one could say that the oldest male was the worst. But the results bear out another part of your theory: the relative numbers of offspring from B and C remained constant in experiments nearly a year apart; see Table 1.
4. An experiment on heterospermic insemination with cattle is being projected at an A.I. research centre in Reading. It is not my experiment but I have a say in the proposals. I have asked them at least to record the ages of the bulls and if possible to choose bulls of widely different age. It is possible that two breeds of bull will be used. This experiment should at least show whether the relative sperm competitiveness of a pair of bulls remains constant over the years. But I am afraid the scale of the experiment is rather small - about 5 bulls and 100 daughters/dams. In terms of work, of course, it is a large experiment, since the paternity of offspring is to be settled by blood-typing of every animal!

Kind regards to Mrs. Szilard and yourself,

Yours sincerely,

R. A. Beatty

R.A. Beatty.

* Sent under
Separate cover

file: Biology

January 22, 1964

R.E. Beatty, Esq.,
Institute of Animal Genetics
West Mains Road
Edinburgh 9, Scotland

Dear Dr. Beatty:

On my return to Washington I was so swamped with work I was not able to answer any of my mail and I am only now beginning to catch up with it. I did receive your letter of October 16 and I meant to tell you that I passed through London in October and saw Dr. Napier. We have tentatively concluded that the experiment which you and I had discussed would be best done on rabbits and that it would be best to use a wild type population and to perform the experiment using pooled semen of say 20 rabbits, picked out of the population at random, of one given age. This pooled semen would then be mixed with a similar pool of semen taken from another 20 rabbits which are about say one year older. Does this make sense to you?

I shall write you, if I may, in a few weeks in greater detail about this and other matters.

With kindest regards,

Sincerely,

Leo Szilard

LS:jm



file: aging

Professor C. H. Waddington, C.B.E., Sc.D., D.Sc., F.R.S.

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University Department of Animal Genetics, A.R.C. Unit of Animal Genetics & M.R.C. Induced Mutagenesis Group

Telephone: NEWington 1081

11th Feb 1964

Dear Dr. Szilard,

Thank you for your letter of January 22nd.

I am glad you are moving towards the experiment with Napier. I have a few comments which could best be put in conversation, but what I have been feeling is briefly as follows. I take it that one point in pooling semen of 20 old rabbits is to randomize individual differences between males, and the same remark applies to the pooling of semen of 20 young rabbits. Napier and I have both shown that certain individual males have very competitive semen in the heterospermic sense, so that they father all or nearly all the offspring. There is therefore a risk that the progeny resulting from the pooled semen of 20 males will be sired by, say, only 4 or 5 of the males. The randomization might therefore be much less effective than expected. Since you have to do many inseminations anyway, I wonder why you do not mix in pairs of rabbits, i.e. each insemination to consist of semen from one of the old males and one of the young males. The full scheme would give 20×20 combinations = 400, which is perhaps too many, but one could reduce the number of combinations in some systematic way - for instance, by making a balanced sampling system such that each old male is tested against only four young males, and each young male against four old males. I have something of the same problem with the cattle experiment I mentioned to you (in which I hope to superimpose a test of age of male); we have 5 bulls of one breed and 5 of another, and we may be able to carry out 30 inseminations with each of the full 25 combinations of bulls.

I will mention this point to Napier if we happen to meet.

Yours sincerely,

Dr. Leo Szilard,
The Salk Institute for Biological Studies,
Post Office Box 9499,
San Diego, California, U.S.A.

R.A. Beatty
R.A. Beatty,

March 12, 1964

R.A. Beatty, Esq.,
Institute of Animal Genetics
West Mains Road
Edinburgh 9, Scotland

Dear Dr. Beatty:

I am grateful to you for your letter of February 11. A misunderstanding crept in somewhere inasmuch as I discussed with Napier the problem and we concluded that the rabbit and not the turkey would be the animal of choice but there was no thought that Napier would do an experiment with rabbits, rather rabbits are your domain. I have not as yet given up the hope to convince you to make time for this experiment.

I am in the process of moving to La Jolla and after I get settled here I shall, if I may, write you again about this matter.

Yours sincerely,

Leo Szilard

LS:jm