

THE EFFECT OF MULTIPLE MALE MATING ON REPRODUCTIVE SUCCESS.

An investigation to establish whether there is an effect of multiple male mating on female bean beetles reproductive success.

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INTRODUCTION

The female bean beetle (*Callosobruchus maculatus*) oviposit on a variety of beans, but they are known to be selective in the type of the bean in which they place eggs (Mitchell, 1975).

The female bean beetle has in addition a spermatheca in which she can store excess male sperm. It was also shown that the male bean beetle inseminate on average 7 times more sperm than the female can store (Eady, 1995).

METHOD

The amount and type of beans chosen were based from the results of a previous study, which can be seen in figure 2. 20 red beans were placed in each petri dish with a varying number of virgin male and female bean beetles.

Condition one - 1 virgin female and 1 virgin male bean beetle.

Condition two - 1 virgin female and 2 virgin male bean beetle.

Condition three - 1 virgin female and 4 virgin male bean beetles.

Six replicas made of each condition. Left for 3 days to allow the mating and egg laying to take place. Beetles removed from petri dish and the eggs laid were counted. The set up of the experiment can be seen in figure 1.

H₀: No difference in females egg laying behavior, when multiple males are in their environment.

H₁: There is a difference in females egg laying behavior, when multiple males are in their environment.

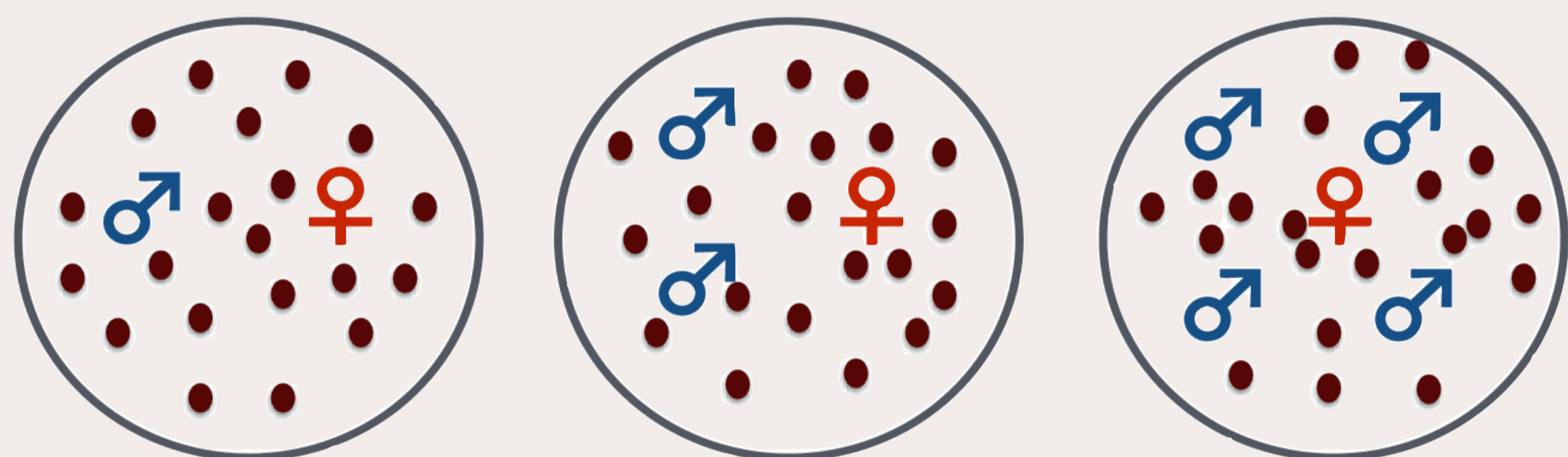


Fig.1: The approach of the experiment, were one, two and four males were put together with one female in a petri dish with 20 beans.

Results

No significant difference (with a p -value of 0.79 calculated with the ANOVA one-way test) between the three conditions, when it comes to the reproductive success with multiple male matings.

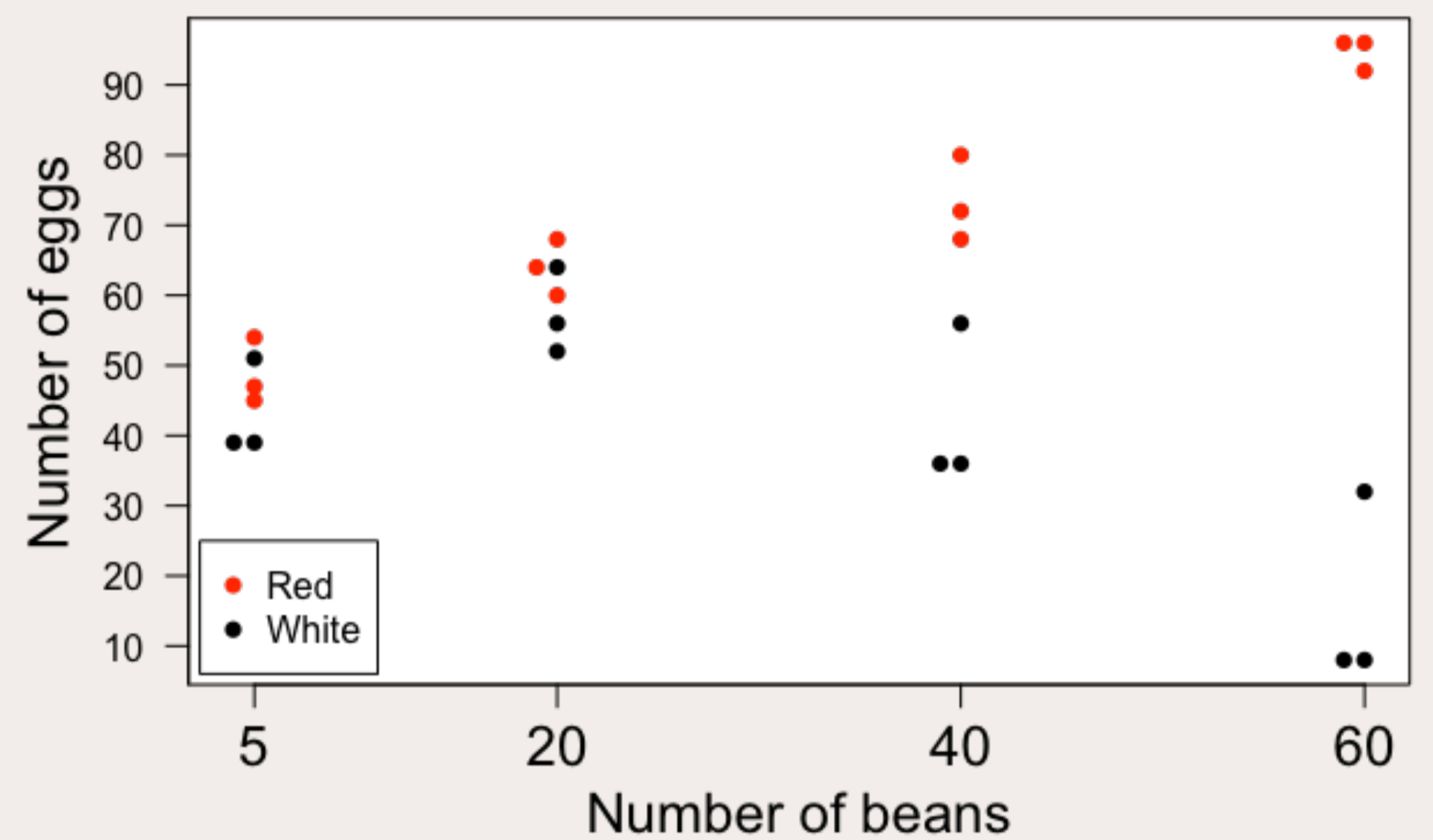


Fig.2: Results of the first experiment, where the amount of eggs in proportion of the amounts of beans were counted.

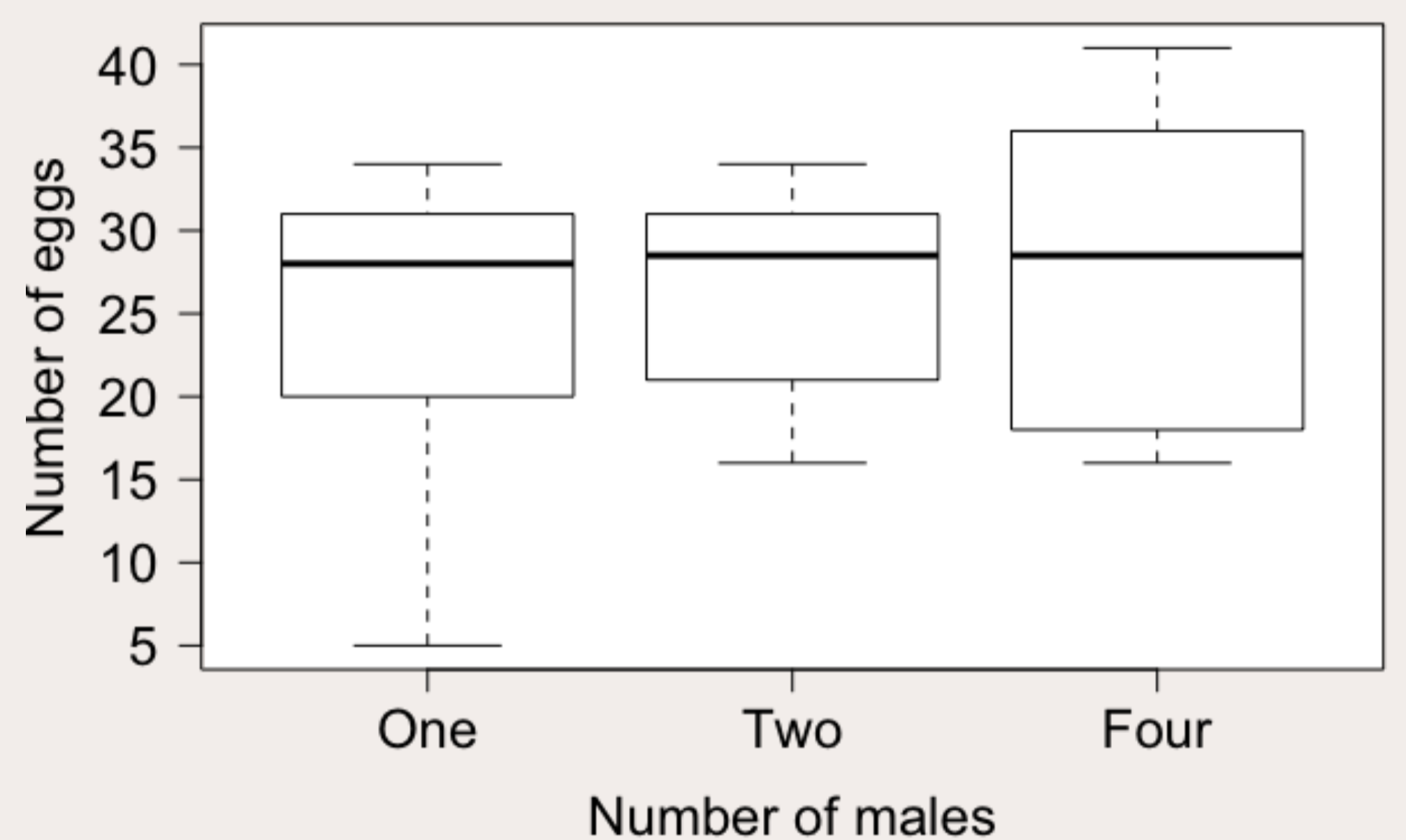


Fig.3: Boxplot of the three different conditions one male, two males and four males.

Conclusion

There is no increase in the reproductive success of females, while multiple males are in their environment.

A explanation for this could be that the oviposit rate of the female could be longer than 3 days, which concludes that the female can only be fertilized once during that time.

Future approaches

- Do more than six replicas
- Have more conditions set up- more males
- Alternative measure of reproductive success such as measuring the numbers of eggs hatched successfully.
- Field experiment so more naturally occurring variables.
- Alter the lab conditions (e.g. Temperature; light; petri dish size)

REFERENCES

- Eady, P.E. (1995) Why do male *Callosobruchus maculatus* beetles inseminate so many sperm?; *Behav. Ecol. Sociobiol*, 36, 25-32
- Mitchell, R. (1975) The Evolution of Oviposition Tactics in the Bean Weevil, *Callosobruchus maculatus* (F.); *Ecology*, 56(3), 696-702