Chapter 9.7: Generation interval

The genetic response to selection predicts how much better the next generation will perform compared to the current generation. Playing around with the components of the formula of genetic gain will give you a feeling for how selection decisions can influence the response to selection.

From the example on show jumping of rabbits you have seen that selected proportion and accuracy of selection are of influence on the predicted response to selection. The problem that we are facing is that the genetic gain that we predicted is expressed per generation. How long is a generation?

Definition

The generation interval is the average age of the parents at birth of their offspring that in their turn will produce the next generation of breeding animals. The generation interval facilitates to calculate the genetic response per year instead of per generation.

A genetic gain of 1.10 cm per generation does not give much information. Obviously, if rabbit generations would last 0.3 years, this is much faster genetic gain than if generations last 1 year. To get a good impression of the achieved genetic gain, even if you don’t know how long a generation lasts, the genetic gain needs to be expressed in time units. A commonly used time unit is a year. To be able to express the genetic gain per year you need to know how many years a generation lasts. Obviously, the first offspring is born at an earlier age of the parent than the last offspring. Some animals have their first offspring earlier than others, and some animals will have only one offspring, whereas others will have more. How to take all that into account? The definition of the length of the generation interval (abbreviated as \( L \)) is to take the average age of animals when the average offspring (number) is born. AFTER selection of the animals as parents. The word ‘after’ is important here, because it is important to realise that in case of selection based on progeny performance testing, the progeny that are used to base the selection on officially are not part of the generation interval. Figure 4 presents a schematic overview of the concept of generation interval. In the top is the situation where animals are selected either on own performance or on performance of their sibs.

![Generation interval diagram](image)

Figure 4. Schematic overview of the principle to the generation interval. In the top figure the situation where animals are selected on their own performance or that of their sibs, and in the bottom figure is the situation where animals are selected based on the performance of their first progeny. Those offspring do not count in determining the generation interval, resulting in an extended generation interval in populations where parents are selected on progeny performance.