

## BREEDING AGAINST CANNIBALISM IN LAYING HENS USING INFORMATION OF GROUP-KEPT RELATIVES

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Mortality due to cannibalism is a serious welfare and economic problem in different housing systems (Blokhuis and Wiepkema, 1998). The most common way of preventing mortality due to cannibalism is to beak-trim the laying hens, but this will be prohibited in The Netherlands. Although mortality due to cannibalism is variable between strains and among flocks within strain, mortality due to cannibalism above 30% has been reported in flocks of laying hens with intact beaks (Craig and Muir, 1996). Muir (1996) showed that it is possible to select against mortality in multiple bird cages by using group selection. After 6 generations the percent mortality of the selected line in multiple-bird cages decreased from 68% to 8.8%, so that it was similar to the mortality in single-bird cages (9.1%).

In commercial poultry breeding, selection candidates are kept individually under strict bio-security conditions, to reduce loss of animals, enable individual recording of production traits and make a fair comparison between selection candidates (Hunton, 1990). Cannibalism-related mortality is expressed only when hens are housed in multiple-bird systems (Muir and Cheng, 2004). That is why it is not possible to use group selection to select against cannibalism. To select against cannibalism in individually housed laying hens, an option is to use information of group-kept relatives.

Results show that the response to classical group selection is proportional to  $[(n-1)r+1]r_{pc}$  (Griffing, 1967; Muir and Schinckel, 2002), whereas response to selection of individuals based on group-kept relatives is proportional to  $nr$ , where  $n$  is group size,  $r$  relatedness between candidate and its relatives, and  $r_{pc}$  the purebred-crossbred genetic correlation. Our results show that selection of individually kept laying hens, based on mean phenotype of their group-kept relatives gives 80% of the response ( $n=4$  and  $r_{pc}=0.5$ ) of classical between-group selection. Decreasing  $r_{pc}$  gives less difference between the responses of the classical group selection method and the method mentioned above, using group-kept relatives.

Consequently, the use of group-kept sibs or progeny of selection candidates enables efficient breeding against cannibalism. A selection experiment applying this method in chicken lines is currently executed.

**Key words:** multiple-bird housing systems, cannibalistic mortality, selection

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