

FACTORS LIMITING PROGRESS FROM SELECTION IN POULTRY

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This report focused on 3 different aspects of selection for improved productivity in layer chickens. The first dealt with the extent to which effective population number, N_e , limits progress as a consequence of inbreeding depression. It was shown for lines consisting of 8 sires each mated to 6-8 dams ($N_e = 20$), that selection directed solely towards improved egg production, is only about 75 per cent efficient as a consequence of the loss due to inbreeding depression. Likewise, the loss in selection efficiency was estimated to be 41 per cent and 53 per cent for adult viability and hatchability when these are the sole criteria of selection.

The second question concerned the environment in which a flock undergoing selection is maintained. In particular, there is the question of the effect of disease organisms present in a flock on expected progress from selection. It is shown that under certain circumstances, mass selection for egg production may be more effective than family selection in eliminating disease organisms and in increasing genetic resistance to disease as well as in improving egg production.

The third question concerned improvement in viability and productivity by use of modern methods of immunogenetics. The genetic basis for resistance to Marek's disease and to lymphoid leucosis is controlled by relatively few genes with major effects located on the B major histocompatibility complex (MHC). Furthermore, these loci are closely linked to the immune response region of MHC and that this region can be labeled with an amino acid polymer, Glu-Arg-Tyr. This method may have potential value in the early selection of individuals for disease resistance to neoplasms.

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