EFFECTS OF DIETARY PROTEIN AND LINOLEIC ACID ON SECOND-CYCLE
PERFORMANCE OF FOUR STRAINS OF LAYING HENS

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An objective of second-cycle management in the current Australian market is to maximise egg number while minimising egg weight. Nutrition in the period immediately following rest induction is often considered to be especially important in achieving satisfactory second-cycle performance. In the first laying cycle egg weight responds to both dietary protein concentration (Morris and Gous, 1988) and, in at least some strains of bird, linoleic acid (LA) concentration (Mannion et al., 1992; Leary et al., 1998).

Following a study of the effects of protein and LA levels on first-cycle performance of two local and two imported strains of layer (Robinson and Datugan, 1998), birds were moulted at 64 weeks of age by feeding barley for 18 days and were re-allocated to post-moult treatments, equal numbers of experimental units from each previous treatment to each new treatment. A total of 176 units of 6-8 birds were used. Moulted birds received one of two recovery diets for a 23-day period (R1 145 g/kg protein, 8.8 g/kg LA; R2 178 g/kg protein, 20 g/kg LA), following which they received one of three post-recovery diets which were fed until 102 weeks of age (P1 156 g/kg protein, 8.2 g/kg LA; P2 156 g/kg protein, 20 g/kg LA; P3 178 g/kg protein, 20 g/kg LA).

Barley intake in the moult induction period was higher (P<0.01) in local than in imported strains, and higher (P<0.05) in birds that received 165 g/kg as opposed to 183 g/kg protein diets in the first laying cycle. Differences in barley intake had little effect on bodyweight loss, which averaged 19.5%. Post-moult performance criteria were unaffected by first-cycle laying diet. Following the moult R2 birds resumed lay sooner and achieved a higher peak (P<0.05) than R1 birds. In the recovery period R2 birds laid heavier eggs, ate more food, gained more weight and produced fewer downgraded eggs than R1 birds (P<0.05). Recovery period diets had no effect on overall post-recovery performance other than feed intake, for which there was an interaction (P<0.05) with strain and post-recovery diet. In the post-recovery period, the average increase in egg production of moulted over unmoulted birds was 19.2% in local strains (P<0.01) and 14.3% in imported strains (P<0.01; strain difference P<0.01). The proportion of downgraded eggs was reduced (P<0.05) but egg weight was unaffected by mouling. In the moulted treatments, diet P1 was associated with higher feed intake (P<0.01), poorer feed conversion (P<0.05) and (in imported strains only) lower egg weight (P<0.05) than other diets, and tended to be associated with higher rates of lay. P2 birds of all strains tended to lay heavier eggs than P1 birds (2.1 g difference in Hyline Brown birds, P<0.01). P3 imported strains laid 5% more eggs (P<0.05) and produced 6% more total egg mass (P<0.05) than P2 imported strains. These results suggest that in the second laying cycle dietary LA concentration affected egg weight in all four strains while protein concentration affected egg number in imported strains only. A high-protein post-moult recovery diet improved early performance but was of little benefit in the longer term.


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