

ESTIMATION OF THE MILK INTAKE OF LAMBS BY SIMULATION OF THEIR
TRITIATED WATER ACCUMULATION

H. DOVE*, K.R. CHRISTIAN*, J.Z. FOOT** and M. FREER*

Deuterium oxide and tritiated water (TOH) can be used to differentiate milk intake from total water turnover in young animals (Dove et al. 1987). However, it would also be convenient to have a single-marker procedure whereby the milk intake of the offspring could be estimated from its accumulation of TOH, previously injected into the dam as part of the estimation of body composition or supplement intake (Dove 1984). This would also require a separate estimate of the body water pool size and its rate of change in the offspring.

Border Leicester X Merino ewes suckling Dorset Horn-sired lambs (23 single, 10 sets of twins) grazed pastures at two stocking rates (SR, 17 and 31 ewes/ha). On day 15 of lactation, ewes and lambs were injected with 8 MBq and 1.5 MBq respectively of TOH and were bled to estimate body water content by isotope dilution. Further blood samples were taken from the ewes 5, 9 and, in half the ewes, 14 d after injection. Lambs were bled again 1, 3 and 5 d after the initial injection, after which they received a further injection to estimate the increase in the body water pool size. A further blood sample was then taken 9 d and, in half the lambs, 14 d after the initial injection.

Flows equivalent to ewe water turnover, lamb water turnover and milk water intake were estimated from the specific activity of the water extracted from ewe and lamb blood, by using an iterative least-squares simulation procedure. These estimates and the lamb liveweight gains are shown in the table.

	Singles	Twins	High SR	Low SR	SED
Ewe turnover (ml)	6770	8949	6856	7971	745.1
Lamb turnover (ml)	1555	1093	1191	1483	87.9
Milk H ₂ O intake (ml)	1195	827	867	1174	117.0
Milk intake (ml)	1419	983	1031	1393	138.9
Liveweight gain (g)	247	184	185	249	19.3

The differences between birth types and stocking rate were highly significant ($P < 0.005$, $P < 0.025$ respectively) for all lamb variates. The difference in water turnover between single-suckling and twin-suckling ewes was also significant ($P < 0.01$). Milk intakes were consistent with previous reports (Dove and Freer 1979). Liveweight gains were closely related to milk intake ($r = 0.77$, $P < 0.001$) and were, on average, 179.1g/d per litre of liquid milk.

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*CSIRO, Division of Plant Industry, G.P.O. Box 1600, Canberra, Australian Capital Territory 2601

**Pastoral Research Institute, P.O. Box 180, Hamilton, Victoria 3300