

EFFECT OF CONTINUOUS CHALLENGE WITH *TRICHOSTRONGYLUS COLUBRIFORMIS* ON
LIVEWEIGHT GAIN AND WOOL GROWTH OF RESISTANT SHEEP

B.M. WAGLAND*, J.W. STEEL* and J.K. DINEEN*

Previous studies have suggested that wool growth may be reduced during development and/or expression of resistance to infection with *Trichostrongylus colubriformis* (Barger et al. 1973; Barger and Southcott 1975). In this experiment the effect of continuous larval challenge with this parasite on liveweight gain and wool growth was determined in young sheep made highly resistant to infection by vaccination with Y-irradiated larvae.

Merino wethers, aged five months, were divided into four groups. During the first 12 weeks (vaccination period) Groups 1 and 2 received three intraruminal doses of 60,000 irradiated *T.colubriformis* larvae at four-week intervals; Groups 3 and 4 were unvaccinated. At week 12 all animals were dosed with anthelmintic. Commencing at week 13, and continuing for 20 weeks (challenge period), Groups 1 and 3 were given 3000 normal *T.colubriformis* larvae intraruminally three times weekly; Groups 2 and 4 were unchallenged.

TABLE 1 Liveweight gain and wool growth in vaccinated (V) and non-vaccinated (NV) sheep challenged with 9000 *T.colubriformis*/week (C) or not challenged (NC)

Group	Period (weeks)							
	Vaccination			Challenge				
	0 - 4	4 - 8	8 - 12	13 - 17	17 - 21	21 - 25	25 - 29	29 - 33
Liveweight gain (kg)								
1. V/C	2.76	-1.45 ^c	2.23 ^b	4.50 ^a	2.73 ^a	2.74 ^a	2.49 ^a	3.58
2. V/NC	2.59	-1.11 ^{bc}	1.61 ^b	3.46 ^{ab}	3.54 ^a	2.75 ^a	2.84 ^a	3.01
3. NV/C	3.64	0.40 ^{ab}	4.20 ^a	2.50 ^b	-0.74 ^b	-1.25 ^b	0.16 ^b	2.51
4. NV/NC	3.59	1.11 ^a	4.69 ^a	3.79 ^{ab}	2.11 ^a	2.93 ^a	2.16 ^a	3.10
Wool growth (% of weeks 0 - 4)								
1. V/C	100	91	95 ^{ab}	123	132 ^a	136 ^a	136 ^a	146 ^a
2. V/NC	100	89	84 ^b	105	114 ^{ab}	123 ^a	115 ^a	123 ^a
3. NV/C	100	98	116 ^a	116	90 ^b	65 ^b	69 ^b	88 ^b
4. NV/NC	100	107	118 ^a	124	118 ^a	124 ^a	118 ^a	124 ^a

Within each period values with the same superscript do not differ significantly (P > 0.05). n = 8 except for NV/NC where n = 7.

The results showed that production losses occurred during vaccination. However, during challenge rates of liveweight gain and wool growth were similar for Groups 1, 2 and 4 whereas non-vaccinated, challenged animals (Group 3) lost weight and grew up to 47% less wool than controls (Group 4). Faecal egg counts showed that Group 1 was highly resistant and titres of circulating complement-fixing antibodies to *T.colubriformis* larval extract indicated that rejection of the challenge infection involved immunological reactivity.

It is concluded that, although there was a temporary production loss during vaccination due to pathogenicity of irradiated larvae and/or a developing immune response, the productivity of highly resistant sheep is unaffected by continuous challenge with larvae.

BARGER, I.A. and SOUTHCOTT, W.H. (1975). Aust.J.Exp.Agric.Anim.Husb. **15**: 167.
BARGER, I.A., SOUTHCOTT, W.H. and WILLIAMS, V.J. (1973). Aust.J.Exp.Agric. Anim.Husb. **13**: 351.

*CSIRO Division of Animal Health, Private Bag 1, Glebe, N.S.W. 2037.