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TAENIA OVIS CYSTS IN LAMB MEAT: THE RELATIONSHIP BETWEEN THE NUMBER OF CYSTS OBSERVED AT MEAT INSPECTION AND THE NUMBER OF CYSTS FOUND BY FINE SLICING OF TISSUE

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Madam:- The *Cysticercus ovis* survey of McNab and Roberston,[1] conducted in New Zealand from 1967–70, concluded that meat inspection results seriously underestimated the incidence of *C.ovis*, and that the true incidence could be 5–10 times that based simply on routine inspection. This survey found that figures were 50% higher on average than the figures produced by the specific works on that day, indicating that an interested observer looking for only *T. ovis* cysts, could find more cysts than the meat inspector. From 190 carcases that had no observable cysts at meat inspection, 50 (26%) were found to contain cysts when finely sliced. The estimate of true incidence

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TABLE I: RELATIONSHIP BETWEEN THE NUMBERS OF *TAENIA OVIS* CYSTS OBSERVED DURING MEAT INSPECTION, AND AFTER THIN SLICING OF ALL MUSCULATURE, IN SHEEP AND LAMBS

Sheep No.	Meat Inspection						Inspection by Slicing					Total Cysts
	Masseter	Heart	Tongue	Diaphragm	Outer Carcase	Inner Carcase	Masseter	Heart	Tongue	Diaphragm	Carcase	
325											1	1
382											1	1
327		1						1			0	1
337											1	1
352											1	1
2605				1						1	0	1
2613											1	1
2674											1	1
395											2	2
383										1	1	2
318											2	2
344											2	2
353											2	2
339											2	2
391								1			1	2
398											2	2
334							1				1	2
362	1						1				1	2
354											2	2
2645											2	2
332										1	1	2
330							1				2	3
380								1			2	3
396											3	3
372	1						1				2	3
357											3	3
323										1	2	3
336									1	1	1	3
348				1						1	2	3
371											3	3
2632		1				1		1			2	3
2663				1				1		1	1	3
341		1						2			2	4
367				1						1	3	4
376											4	4
358											4	4
331		1						1			4	5
375							2	1			2	5
347				1						1	4	5
312											6	6
2635											6	6
370		1						2			5	7
2643								1		1	5	7
320				1		1		1		1	6	8
957										2	7	9
350								3			7	10
2626								4		2	7	13
386		1		1			1	3		1	10	15
2652		2		1		2		3		2	19	24
2058				1		3		1		1	25	27
388				1			2			1	24	27
390		1		1				2	2	1	30	35
328		1		4	1		3	6		6	54	69
2661	1	3	1	8	1	2	3	44	1	12	86	146
2655	3	12	0	14	4	2	5	12	2	14	156	189
2660	10	10	2	20	4	7	11	45	3	20	188	267
2654	3	8	3	6	4	14	23	32	11	20	224	310
1543	4	7	5	17	4	15	14	48	12	55	1217	1246

was therefore based on the combination of these two factors. No figures were available for the prevalence of cysts in sheep and lambs, and neither were the figures available to relate the number of cysts observed at meat inspection to the number of

cysts actually present in the carcase. An estimate, based on figures supplied by Gemmell,[2] lead us to suspect that lambs that had five cysts observed on the carcase might have as many as 45 more cysts deep-seated in the musculature. Because the export criterion for lamb carcases is "no more than five observable cysts on the carcase, excluding head, heart and diaphragm", it is of interest to know the relationship between numbers of cysts on the carcase and numbers of deep-seated cysts within lamb carcases.

During the necropsy of experimental lambs, we took the opportunity to compare the number of *T. ovis* cysts detected by a thorough meat inspection, with the number detected by finely slicing all musculature.

One hundred lambs from *T. ovis* vaccination trials were killed in the abattoirs at Wallaceville Animal Research Centre, and the skin removed. For the simulated meat inspection, the external carcase was inspected visually and by palpation. Intestines and liver were removed, the diaphragm inspected *in situ*, and then this was removed. The heart and lungs were removed and the heart inspected. The head was removed, the masseters inspected and the tongue was removed and palpated. The carcase was then inspected internally, visually and by palpation. The number of *T. ovis* cysts observed in each organ were recorded. For the determination of the total number of cysts present, the diaphragm, after further inspection, was then finely sliced, as were the heart, masseters and tongue. The next day all carcase musculature was removed from the bones and finely sliced. Live cysts were larvae of 3–4 mm diameter with a white scolex observable within a clear bladder. There was little or no host reaction. Dead or dying cysts were caseated or calcified lesions of 5–10 mm diameter containing parasite remnants. Most cysts were dead.

Results are presented in Table I for the 58 lambs in which one or more cysts were found. No cysts were found in forty-two lambs that had been vaccinated against *T. ovis*. Lambs with a total of 15 or more cysts were all classified as infected at meat inspection, in contrast to 28% (13/47) of lambs with less than 15 cysts. Lambs with three or less observable carcase cysts contained up to 86 deep-seated cysts only detected by slicing. The total number of cysts in 34 lambs with no cysts detected at meat inspection ranged from 1–13 (Mean = 3.4, Standard Deviation = 2.8). The number of cysts in the carcase meat of these lambs ranged from 1–7 (Mean = 2.6, Standard Deviation = 1.9).

These data were not collected at random, and no conclusions can be drawn concerning the incidence or prevalence of *T. ovis* cysts in the National lamb flock. The lambs were selected from trials set up to determine the efficacy of various immunization procedures against *T. ovis* cysts, and it is possible that the experimental procedure may have influenced the distribution of cysts. However, we consider that this is unlikely.

Our meat inspection procedure was especially rigorous, and unlikely to be matched by meat inspectors on the killing chain because of the time available in that situation. We consider that our meat inspection represents the highest standard of routine meat inspection achievable.

Our suspicions as to the number of deep-seated cysts that might be present in carcases passed at meat inspection appear to have been confirmed. Not only does routine meat inspection underestimate the true incidence of *T. ovis* cysts, but it also apparently underestimates the true prevalence.

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