

Table 4. Sheep parasites - summary (adapted from Cole 1986)

Parasite, length, location	Gross pathology	Clinical signs	Significant faecal egg counts (FECs) and worm counts (WC); other
<i>Haemonchus contortus</i> -'barbers pole worm'. 10-30mm. Abomasum.	Abomasum oedematous in heavy and chronic infections. Pinpoint haemorrhages. Red and white 'barbers pole' appearance of females. Abomasal contents brown from leakage of blood.	<i>Heavy infections</i> Mainly in young sheep but all ages can be affected. Exercise intolerance. Anaemia, submandibular oedema, constipation, rapid death. <i>Light infections</i> Ill thrift, mild anaemia.	<i>FECs</i> 2 000+ may be clinically significant. Around 30 000 in heavy infections. Eggs typically strongyle. <i>WCs</i> Heavy infections: 2 000-10 000 worms Light infections 500-1000 worms. <i>Egg output</i> 5-10 000 per female per day. Blood loss from host ~ 0.05 ml per worm per day.
<i>Ostertagia</i> spp - 'small brown stomach worm'. 6-10mm. Abomasum.	<i>Heavy infections</i> Weight loss; worms visible on mucosa in clumps, whitish nodules from worms in gastric glands; folds oedematous, congested.	Weight loss, scouring and even deaths depending on severity of infection.	<i>FECs</i> 500+ may be clinically significant, however significant disease can occur with lower FECs. Eggs typically strongyle. <i>WCs</i> Heavy infections: 5 000-10 000+ worms Light infections 1000-2000 worms. <i>Egg output</i> 100-200 per female per day
<i>Trichostrongylus axei</i> -'stomach hair worm' 3-4mm. Abomasum.	Infections usually light. Much smaller than <i>Ostertagia</i> and difficult to see. Worms mainly in pyloric region. Gastritis in heavy infections.	May contribute to scouring-ill thrift syndrome in mixed/heavy infections.	<i>FECs</i> Counts usually low. Moderate infections may contribute 500-1000 epg to mixed infections. Eggs typically strongyle. <i>WCs</i> Range 2 000-7 000 worms in mixed infections.
<i>Trichostrongylus</i> spp -'black scour worm'. 4-7mm. Small intestine.	<i>Heavy infections</i> Carcase emaciated; mucous exudate, flattening of mucosa (villous atrophy). Worms in first 3 m of SI but hard to see. Mesenteric lymphadenomegaly and oedema.	Especially affects young sheep. <i>Heavy infections</i> Rapid weight loss, scouring, death. <i>Note</i> Pathogenic effects of <i>Trichostrongylus</i> and <i>Ostertagia</i> appear to be more than additive.	<i>FECs</i> 500 -2000 may be significant; over 2000 in heavy infections. Eggs typically strongyle. <i>WCs</i> Heavy infections: 5 000-10 000+ worms Light infections 1000-2000 worms. <i>Egg output</i> 200 per female per day

<i>Nematodirus</i> spp - 'thin-necked intestinal worm'. 10-23 mm. Small intestine.	<i>Heavy infections</i> Worms visible as tangled red mass, concentrated in middle of SI. No specific gross lesions.	Usually non-pathogenic. <i>Heavy infections</i> May be seen in young sheep under dry conditions. Profuse diarrhoea, deaths.	<i>FECs</i> Heavy infections: 500-2000, but sometimes quite low. Light infections: 50-300. Eggs large and easily distinguishable from strongyle. <i>WCs</i> Heavy infections: 5 000-15 000+ worms. Light infections 1000-2000 worms. <i>Egg output</i> 25-30 per female per day
<i>Cooperia</i> spp. 5-8 mm. Small intestine.	No evidence of specific effects. Relatively uncommon in sheep.	No characteristic signs. Usually in mixed infections.	
<i>Bunostomum trigonocephalum</i> - 'hookworm'. 12-26 mm. Small intestine.	Uncommon. Worms clearly visible. Infections usually light. Focal haemorrhages in intestinal mucosa and lungs. Variable anaemia.		<i>FECs</i> Low and of little diagnostic value. Eggs typically strongyle. <i>WCs</i> Range 300-1000 may cause ill thrift, anaemia.
<i>Strongyloides papillosus</i> . 4-6 mm. Small intestine.	Heavy natural infections seldom seen. Experimentally: ascites, catarrhal enteritis, mucosal oedema.	Experimentally: dyspnoea (migrating larvae in lungs) and diarrhoea. <i>Heavy infections</i> Most likely in young sheep under wet conditions.	<i>FECs</i> Heavy experimental infections: 2000-10 000. Eggs smaller than common strongyles and embryonated. <i>WCs</i> Experimental: 100 000-300 000.
<i>Trichuris</i> spp - 'whipworm'. 40-80 mm. Caecum.	Common in tip of caecum, but mostly unimportant. May be important in some conditions eg drought. <i>Heavy infections</i> Thickening and haemorrhage of mucosa; accumulation of mucus.	Usually non-pathogenic. <i>Heavy infections</i> May be seen in young sheep under dry conditions. Ill thrift, mucoid diarrhoea, deaths.	<i>FECs</i> Generally low but useful to diagnose presence of <i>Trichuris</i> . Eggs characteristic (brown with transparent polar plugs). <i>WCs</i> Several hundred in heavy infections but hard to count as worms clump together.

<i>Oesophagostomum columbianum</i> - 'nodule worm'. 12-21 mm. Colon.	Stout white worm with hooked head. Larvae develop in nodules of SI (small gritty lesions) and LI (caseous lesions). Nodules elsewhere in viscera also. <i>Heavy infections</i> Colon thickened, oedematous. Adhesions between loops of bowel. Once a major summer -rainfall parasite, second only to <i>Haemonchus</i> . Still causes losses at some abattoirs (condemnation of nodule-affected small intestines).	Rarely seen now. Weight loss, stiff gait, weakness, intermittent scour.	<i>FECs</i> Heavy infections: 500-1000. <i>WCs</i> 100 worms pathogenic in weaners; 200-300 in adults. <i>Egg output</i> 5-12,000 per female per day.
<i>Oesophagostomum venulosum</i> - 'large bowel worm'. 11-24 mm. Caecum.	Similar to <i>O. columbianum</i> but head not hooked. Relatively non-pathogenic. Results in few if any nodules. <i>Heavy infections</i> Patchy mucosal congestion.	Relatively non-pathogenic. Experimental: scouring, ill thrift. May have partly filled niche vacated by <i>O. columbianum</i> eg in NSW Northern Tablelands.	<i>FECs</i> Uncertain significance. Eggs typically strongyle. <i>WCs</i> Heavy infections; 200-300. <i>Egg output</i> probably similar to <i>O. columbianum</i> (5-12,000 per female per day).
<i>Chabertia ovina</i> - 'large mouthed bowel worm'. 14-20 mm. Colon.	Stout greyish-white worm. Attached to mucosa by buccal capsule (visible as a knob), resulting in petechiae. <i>Heavy infections</i> Mucosa thickened, oedematous, longitudinally ridged.	Widely distributed in winter rainfall areas. Heavy infections uncommon. Light infections: passage of soft faeces with brown mucus and flecks of blood.	<i>FECs</i> Not a specific guide however 1000-2000 may be significant. Eggs typically strongyle. <i>WCs</i> Heavy experimental infections; 500-700 worms Light infections: less than 100 worms. <i>Egg output</i> 5,000 per female per day.
<i>Dictyocaulus filaria</i> - 'large lungworm'. 30-100 mm. Lungs.	<i>Heavy infections</i> (uncommon) Adults in bronchi and bronchioles cause dark red-grey consolidation of caudal lobes and chronic catarrhal bronchitis.	Usually in small numbers, and mostly in young sheep. May cause coughing. <i>Heavy experimental infections</i> Dyspnoea, secondary pneumonia, deaths.	<i>FECs</i> First stage larvae (with distinctive knob on head) passed in faeces. <i>WCs</i> White thread-like worms clearly visible in bronchi. Heavy infections: intertwined worms extend to bifurcation of trachea. Light infections: less than 50 worms.

<i>Muellerius capillaris</i> - 'small lungworm'. 12-22 mm. Lungs.	Adults in (lead) shot-like nodules in lung, immediately under pleura.	Ill thrift in artificially infected sheep.	<i>FECs</i> First stage larvae (no knob on head, but dorsal spine on tail) passed in faeces. <i>WCs</i> Adults live in nodules under lung surface.
<i>Protostrongylus rufescens</i> - small lungworm. 16-35 mm. Lungs.	Rare in Australia. Slender worms which may cause bronchiolitis and focal pneumonia.		<i>FECs</i> First stage larvae (no knob on head, or dorsal spine, but tail is pointed) passed in faeces. <i>WCs</i> No guidelines. Worms reddish and slender.
<i>Ascaris suum</i> . Liver <i>Note: Rare, academic interest only?</i>	Rare infections in sheep, infected from pigs. No specific lesions reported in sheep.	No specific signs reported (Ill thrift in pigs)	<i>FECs</i> Characteristic eggs: brown, thick with pitted outer walls. <i>WCs</i> Worms large and clearly visible in small intestine and bile ducts.
<i>Gongylonema</i> spp. Oesophagus, rumen <i>Note: Rare, academic interest only?</i>	Rare parasite in Australia. Found tightly coiled or as a zigzag in mucosa of oesophagus and forestomachs. No known pathogenic effects. Adults are large nematodes: 60-150 mm long.		Worms long, threadlike, red.
<i>Fasciola hepatica</i> - liver fluke. 20-30 mm. Liver.	<i>Acute fasciolosis</i> (massive infection) Severe anaemia, bloody peritoneal fluid, peri-hepatic fibrinous peritonitis, haemorrhagic tracts in liver. <i>Subacute form</i> Some adults in bile ducts, anaemia, haemorrhagic tracts. <i>Chronic form</i> Bile ducts fibrosed thickened and may contain adult fluke.	Variable, ranging from abdominal pain, severe anaemia and deaths to milder anaemia, submandibular oedema and production loss.	<i>FECs</i> 100+ may be associated with disease (acute and subacute: 150-2500; chronic: 2000-4000), however low counts may be associated with significant production loss. Eggs large yellowish brown, with operculum. <i>Total fluke counts</i> Acute: 1000+ Subacute: 500-1000 Chronic: 100-400 <i>Egg output</i> 10-20,000 per female per day, possibly for life (5-10 years or more)

Paramphistomes. 5-12 mm. Rumen, reticulum, small intestine.	Most damage done by immature parasites embedded in or attached to SI mucosa causing erosions, haemorrhage and oedema. Necrosis of ruminal papillae also may occur.	Rarely causes clinical disease in sheep. Anorexia, watery diarrhoea, submandibular oedema.	<i>FECs</i> Low in acute disease. Eggs large, transparent with operculum. <i>Total fluke counts</i> Acute: 10 000 (up to 100 000) immature fluke in SI.
<i>Moniezia</i> spp., <i>Thysaniezia</i> sp. 1-6 m. Small intestine.	Little or no pathology.	Questionable importance.	<i>FECs</i> Variable numbers. Eggs medium size, triangular, dark grey. <i>WCs</i> Worms may fill the SI of young lambs. No specific lesions.

Important note: This is an overview only. Egg and worm counts are merely indicative. Opinions vary on levels on the significance of different counts for various worms. Additionally, egg and worm counts need to be interpreted in light of the nutritional and physiological status as well as age of the host.