SHEEP HUSBANDRY AND WOOL TECHNOLOGY

In 1996, 67 candidates presented for the examination in Sheep Husbandry and Wool Technology.

SECTION I : SPECIAL TOPIC

Question 1

(a) (i) Most candidates had problems in correctly describing the term *sire evaluation*.

(ii) Some could not fully explain that the central-test sire evaluation examines the genetic performance of sires by evaluating their progeny relative to the progeny of superior merino sires.

(iii) Few students understood the importance of link sires in sire evaluations.

(iv) The majority answered this question well.

(v) Most candidates indicated that, through evaluating more than one group of progeny per stud in the sire evaluation, the performance of each of the studs could be more accurately compared with each other.

(b) (i) This part was extremely well answered by all candidates.

(ii) Most students were able to state correctly that the shaded areas indicated trait leaders for each specific characteristic.

(iii) On the basis of objectively measured wool production, the majority of candidates could easily read the sire evaluation report and indicate the top performing rams, i.e. Nos. 76 and 88.

(iv) On the basis of subjective sheep classing, most candidates correctly indicated rams Nos. 73 and 95 respectively as the top two rams.

(v) Most candidates indicated that, compared with ram No. 80, ram No. 79 had a greater number of measured progeny and, therefore, the results of ram No. 79 would be more accurate.

(vi) This question was very poorly answered.

(c) (i) Most candidates could correctly describe the fleece characteristics of each of the rams, A - D (e.g. Ram A is above average for clean fleece weight and below average for fibre diameter).

(ii) Few candidates could correctly describe the difference between estimated progeny values and true progeny values.

(iii) Again, only a small number of students could explain the relationship between estimated and true progeny value with respect to heritability of the given trait.

Question 2

(a) (i) The majority of candidates had no trouble in gaining good marks in this question.

(ii) Most understood the concept of *subjective assessment* in terms of sire evaluation.

(iii) Here candidates correctly named the following subjectively - assessed conformation traits: *frame size*, *jaw structure*, *neck development* and *leg structure*.

(iv) Students correctly indicated *handle*, *staple length*, *lustre*, *tip structure*, *pigmentation*, *character*, etc, as four possible subjectively-assessed wool quality traits.

(v) The majority correctly indicated *staple length* and *fibre diameter* as two wool traits that can be subjectively and objectively assessed.

(b) (i) Most candidates indicated that the aim of sheep-classing is to provide a uniform flock that increases the profitability to the wool producer.

(ii) The majority of students correctly identified coverage, staple length and density as factors that classers look for when assessing sheep for wool quality.

(iii) Most candidates understood the importance of a good constitution to wool-producing sheep.

(iv) Many could not fully explain the reasons for classing at eighteen months of age.

(v) Some candidates did not understand the term *two-stage classing*.

(c) (i) Candidates who fully understood a sire evaluation report gained almost full marks for this question. Some, however, failed to read the question correctly and indicated only one advantage and/or one disadvantage of rams No. 9604 and No.9606. No candidate commented on *FEC EBV* (ram No.9604 +0.4 - poor, ram No.9606 å0.5 - excellent).

SECTION II

Question 3

(a) (i) The majority of candidates correctly identified the wool-growing region where properties A and B might be located as the Western Division. Some, however, incorrectly stated towns, e.g. Bourke, Broken Hill.

(ii) Candidates were able to name correctly high mortality and micron and the fact that it was a large area as characteristics that helped to identify the region as being the Western Division.

(iii) Most students were able to list correctly mortality rate, locality and predators as three factors that might have led to poor lambing percentages.

(iv) This part was well answered by the majority of candidates who correctly gave *more sheep* and *finer micron* as being possible reasons why property A made more money from wool sales than property B.

(v) The majority of students had no idea how to start the question and, therefore, failed to reach the correct answer.

(b) (i) This question was extremely well answered, with most candidates gaining full marks.

(c) (i) Many were able to state correctly that amino acids are the building blocks of protein.

(ii) Candidates followed the wording of the question and answered by circling option B.

(iii) Most candidates correctly chose crude protein percentage and organic matter digestibility as attributes that are most likely to decline when a plant flowers/matures.

(iv) This part was also well answered by the majority of candidates.

(v) The majority of candidates gained full marks for this question.

Question 4

(a) (i) Few students could describe the *ram effect* of placing a ram close to a group of ewes to help in stimulating oestrus.

(ii) Most candidates could describe the role of oxytocin in milk let-down in a ewe.

(iii) Students presented a large range of correct answers using, as the basis of their answers, the detection of dry ewes and better management through ultra-sounding ewes before lambing.

(iv) The intent of this question was contained in the word *function(s)*, thus indicating that more than one function should be given. *Shelter* and *protection* were the most common answers.

(v) Increasing live weight, ram percentage and the length of joining were the three most common and correct strategies that were given.

(b) (i) Poll Dorset, White Suffolk, Suffolk, Southdown, Texel and Dorset were some of the sheep breeds given as being commonly used as terminal sires in the Australian prime-lamb industry.

(ii) In order to receive full marks students commonly gave large frame, high fertility, large milk production and good mothering ability as desirable characteristics of prime-lamb dams to produce elite lambs.

(iii) Bruising, poor colour and poor tenderness were the most common correct answers indicating traits of meat that had been adversely affected by selling lambs through sale-yards.

(iv) 1. Abdominal fat - kidneys and intestines,
2. subcutaneous fat - under the skin, and
3. marbling fat - between the muscle fibres,
these were acceptable answers.

(v) Few candidates could list *fat* as the first component, followed by *muscle* and then *bone* in the correct order; only a small number could use the correct terms.

(c) (i) Most candidates could correctly identify clean fleece weight as the trait that would most readily respond to selection within a breeding flock because of its high heritability of 0.4.

(ii) Few candidates could define independent culling as being the way in which individual animals are culled at a specified production rate.

(iii) Weighing production characteristics against the mean was very rarely used as an answer, although this was the correct answer.

(iv) Most candidates could correctly explain the term *heterosis*.

(v) Few students could correctly answer this question. Most defined *genotype* and *phenotype* instead of indicating the difference between *phenotype* and *genetic* correlations.

Question 5

(a) (i) Candidates simply listed two factors that can lead to drench resistance in a flock, but did not describe their effect on drench resistance. The most commonly listed factors were under-drenching, no drench rotation and no strategic plan.

(ii) Most candidates gave BZ as the drench to which there was an increase in resistance between 1990 and 1993.

(iii) In an acceptable answer, students stated that *dual resistance* means that worms are resistant to two drenches.

(iv) *Multiple resistance* means that worms are resistant to more than two drenches.

(v) This part was poorly answered. *Drench resistance* occurs when the WORM becomes resistant to a specific drench, while *worm resistance* occurs when the SHEEP is bred to resist worm infestation.

(b) (i) Few candidates could calculate the average price per carcase (approximately $50.00).

(ii) Only a small number of candidates could calculate that the gross margin, using the average price from the previous part, was the income (av. price per carcass) per head minus the variable cost (GM = I - VC). This gave an answer of approximately $35.00.

(iii) Few candidates could answer this question. Cost = base price x kg/head. The correct answer was approximately 7.5 kg/head.

(c) (i) Only a small number of candidates were able to answer this question to its fullest extent. Most could list five unique properties that make wool valuable as a textile fibre. The list included:

the presence of scales giving felting ability,
elasticity and resilience,
non-conductivity,
chemical stability and affinity for dyes,
hygroscopic power, and
heat of wetting and con-flammability.

(ii) Here the majority could give correctly two natural fibres that compete with wool in the apparel market.

(iii) Most could give correctly two synthetic fibres that compete with wool in the apparel market.

(iv) A number of candidates could give correctly a synthetic fibre often used in blends with wool to make fabrics for fashion clothing.

Question 6

(a) (i) 1. Most candidates could correctly read the information on the graph and gave an answer in the range of 5 to 6.

2. The majority of candidates were able to identify the Merino as the sheep with the greatest follicle density.

(ii) Candidates had problems in answering this question as there is only one type of wool fibre, WOOL, present in the sheep's fleece. It was felt that the question should have asked for three types of wool ***follicles***.

(iii) The majority of candidates gave the correct answer in this part, viz, the secondary type of follicle.

(iv) Few students were able to name the critical stage in a sheep's life needed to answer this question correctly, i.e. from about 100 days pre-natal to about 18 months of age.

(v) Only a small number of candidates were able to answer this question adequately. Answers should have included good nutrition, balanced diet, reduced stress, low worm burden and freedom from disease.

(b) This section of the question contained a printing error.

(i) 1. The poor graph quality resulted in answers of approximately 200 cents per kg being accepted.

2. A range of answers were again accepted for this question to compensate for the poor graph quality.

3. Here candidates were able to calculate correctly the sale price, including part (c), which required the yield to be included.

(ii) Most candidates correctly listed two forms of contamination.

(c) (i) Some students failed to indicate the importance of the given characteristics; a small number were unable to use the given scale.

(ii) Few candidates were able to answer this question correctly. They failed to describe fully the method of obtaining and preparing staples from a wool bale for the ATLAS machine. The majority tended to describe how the ATLAS works.

(iii) The majority were able to give two yields published in the wool-sale catalogue, with all four possible answers being given equally.

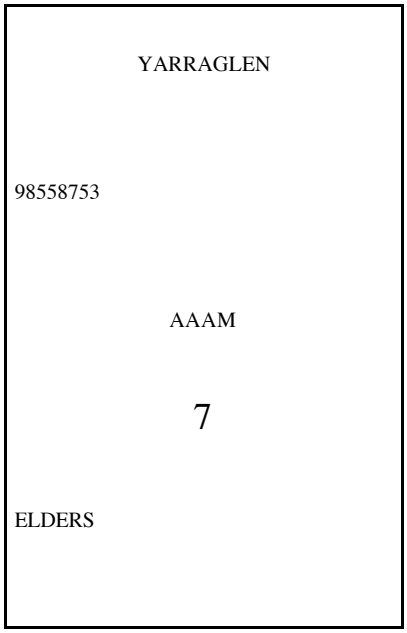
(iv) Few candidates received full marks for this question as they failed to provide the comprehensive answer required. Only one used the formula.

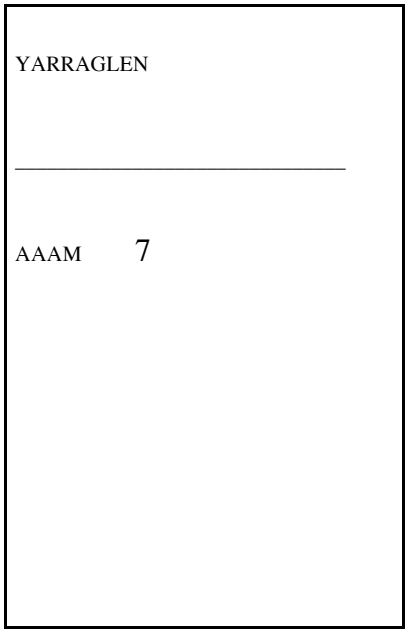
Question 7

(a) (i) Some candidates had difficulty in defining *cast-fleece wools*. Examples of acceptable answers include: AAAC, AAAE, A COM, B COM, Pigmented Wool and Dermo.

(ii) On the bottom of the classer's report, information recorded about the wool from each mob includes: breed, age, staple length, VM type and amount, time of crutching and if mulesed

(iii) Candidates had very little idea of the correct branding procedures as set out in the Code of Practice. They accepted that Face and Head bale brands would be:





(b) (i) An amazing number of candidates chose Geelong and Melbourne as wool selling centres in NSW!

(ii) *Superfine wool* is commonly sold by traditional auction.

(iii) A number of candidates had a problem in describing the sale of wool by tender. In this system prospective buyers submit quotes on wool-lots, in private, the highest quote acquiring the wool, if it meets the grower's reserve.

(iv) This question proved difficult for some candidates. The mandatory prime characteristics necessary for AWEX-ID are: breed, wool category, style, and VM type.

(c) (i) Most candidates were able to calculate the percentage of sale lots in excess of the desirable level for each pesticide, OP and SP.

(ii) Very few candidates were able to outline two strategies to reduce chemical residues in greasy wool. Acceptable answers would have been:

- Eliminate or minimise chemical use.
- Apply the chemical at the correct time, following the manufacturer's instructions.

(iii) The majority of candidates possessed poor knowledge of the carbonising process, in which heavily burred wool is placed in a 7% sulphuric acid bath, to reduce the burr to a carbon form. This product is then dried and put through a heavy roller to crush the carbonised VM into a dust, which is subsequently blown out.

(iv) This question was answered well by those who attempted it.

SECTION III : ESSAYS ON SHEEP HUSBANDRY AND WOOL TECHNOLOGY

General Comments

The standard of essays was again very, very poor since students apparently had little idea of reading and interpreting the question and presenting information in a logical sequence.

Attention to spacing, indenting and underlining would assist greatly in presentation.

Question 8

(a) The five main options open to prime-lamb producers for marketing their product are:

1. Saleyard auction.
2. Auction based on sale by description through CALM.
3. Over-the-hook sales:
   - through CALM
   - through a livestock agent
   - direct to an abattoir
4. Private contract sales
5. Paddock sales.

Few candidates knew the five options, or were able to make a clear distinction between them.

A small number indicated the advantages of saleyard auction, viz. *agent guarantee, ability to set a reserve, fast, good competition and average price for the whole pen.*

The disadvantages of this system are - *extra time off feed, stress, bruising and no feedback on weight or quality*.

Candidates appeared to have a reasonable understanding of auction by description on CALM, the advantages of which are: *minimal stress and handling, independent assessment for quality and nation-wide competition*. The main disadvantage at this stage being buyers' uncertainty about whether lambs meet their description in the catalogue.

Very few candidates had any idea of the concept of over-the-hook sales. They failed to indicate that carcases are dressed according to the AUS-MEAT standard while a price-grid system is used, with premiums for meeting the specific carcase and fat depth requirements of the buyer. Feedback is given for each lamb. The only disadvantage to this method is lack of competition or room to negotiate the price.

The majority of students listed paddock-sales direct to the buyer as the main option to saleyard auction. The advantages of this system is reduced stress and handling for the sheep, while buyer and seller can bargain for a price without the sheep's leaving the farm. Few, if any, listed the disadvantages as being lack of competition and lack of feedback on carcases.

Private contract sales were not mentioned by most candidates as an option. The advantages of a guaranteed price if the seller meets the target specification mean that the price is known before the lambs are born and grow. The main disadvantage is that, if the market price rises in the meantime, the producer is locked into a contract price and there is no competition for the price received.

(b) Very few candidates answered this question fully, failing to outline the *cause*, *symptoms*, *life cycle*, *prevention* and *treatment* of each disease as requested in the question.

The marking panel offers the following summary as an example of the answers sought:

Tetanus

Cause:	Toxin produced by the bacterium Clostridium tetani.
Symptoms:	Spasms of the body muscles, head tremors, restricted jaw movement, dilated nostrils and pricked ears. Tail held out stiffly, muscle stiffness in the legs. Initially the walk becomes a stiff gait. Intermittent convulsions. Hypersensitive to sound.

Life Cycle: Spores present in the soil in an inactive form, these infect sheep through a skin wound, germinate and multiply in dead or bruised skin. These spores produce a potent toxin which spreads to the nerves, spinal cord and brain.

Prevention:
1. Pre-lambing vaccination
2. Vaccinating the lambs twice
3. Hygiene.

Treatment: This is expensive and sheep do not respond well. Kill the tetanus bacteria - Penicillin - neutralise any circulating toxin and provide nursing care, sedate and feed sheep.

Flystrike

Cause: Green blowfly - Lucilla Cuprina.

Symptoms: Breech, body, pizzle, poll; wound - moist, smelly and irritating, green patch, sheep weak, alone and dull.

Life Cycle: Lucilla Cuprina lays eggs in moisture, eggs hatch within 36 hours. Maggots feed for 3-4 days, drop into the ground to pupate for upwards of 7 days. Adult flies emerge and after a few days are ready to lay eggs.

Prevention: Cull susceptible sheep, prevent scouring, correct tail length, crutch/ring, shearing, jetting, etc.

Treatment: Clip wool around affected wound. Treat with jetting fluid.

Pregnancy Toxaemia

Cause: Low nutrition in the last 6 weeks of pregnancy. If the ewe is forced to break down her own body tissue too quickly, toxic waste accumulates.

Symptoms: Dullness, loss of appetite. Stands alone, does not respond, appears blind, goes down.

Prevention: Careful dietary management during late pregnancy. Minimum stress, do not allow pregnant sheep to become too fat.

Treatment: This is usually unrewarded. Solution of glucose or dextrose, application of obtainable plastic packs from veterinary surgeons.

Selenium Deficiency

Cause: Selenium deficient areas occur particularly in spring.

Symptoms:
- White muscle disease - walk with a stiff gait, appear weak and die.
- Ill-thrift - *poor doers*.
- Reduced fertility - dry ewes at lamb marking, death of embryo early.

Prevention: Supplement of selenium in deficient areas. Selenium is sold in vaccines and drenches, or as selenium pellets.

Treatment: Selenium drench or vaccination. Most treated sheep recover. Care should be taken to avoid overdosing and poisoning.

Lice

Cause:
- Body lice - Damalinia ovis
- Foot lice - Linognathus pedalis
- Face lice - Linognathus ovillus

Symptoms: Irritation of the skin causing the sheep to rub. Fleece derangement, resulting in ragged fleece and pulled staples. Wool on fences.

Life Cycle: Live in the fleece close to the skin. Lay eggs attached to the wool fibre within 5mm of the skin. Eggs hatch and develop through a series of immature stages to result in a new generation.

Prevention: To ensure that sheep stay free of lice, ensure that no lice-infested sheep come into contact with the flock. Construct secure boundary fences. Quarantine or isolate new sheep for 6 months and check regularly. Check for lice whenever sheep are in the yards.

Treatment: Pour-ons, off shears. Dipping within 2 months. Jetting up to 10 months growth.

Brucellosis

Cause: Brucella ovis

Symptoms: Rams do not appear sick. Enlarged hard epididymis.
A disastrous lambing.

Prevention: Purchase rams from accredited brucellosis-free flocks.
Do not borrow or lend rams. Maintain good boundary fences to avoid strays.

Treatment: No effective treatment. Sell all rams, test and cull.

Barber's Pole Worm

Cause: Haemonchus Contortus.

Symptoms: Affects weak sheep which develop *bottle jaw* and are mildly anaemic (they need not be in poor condition). Ill-thrift.

Life Cycle: Live in the abomasum (4th stomach) - attach themselves to the lining, blood-sucking. Female produces 5000 to 10000 eggs per day, pass out in faeces to pasture which becomes heavily contaminated. Warm weather plus moisture leads to the hatching of the eggs, larvae develop, sheep eat larvae from the pasture. Some larvae develop into worms, others remain dormant in the stomach wall for months, if conditions are cold.

Prevention: Through well balanced drenching and management program, e.g. Wormkill. Pasture spelling.

Treatment: Broad spectrum drench. Drench resistance test. Use narrow spectrum - Closantel (Seponver), kills up to 4 weeks after use.

Question 9

(a) Again, candidates failed to show any depth of knowledge about minimising contamination of the wool-clip by the **wool grower, wool classers and shed staff**. The following points should be considered:

Wool grower :
Cull pigmented sheep
Pick-up all bale twine
Crutching/ringing - *within 3 months of shearing*
Health management - *drenching, mulesing, correct tail length.*
A clean shed at shearing. No **hard** or **soft** contaminants - wire, etc.

Independent audit - Clipcare, Dalcare.

Wool classer :
Shed/yard preparation/inspection prior to shearing.
Instructions to shed staff - awareness/removal of contaminants.
A **tidy** shed. Nothing left out of place to be picked up in the wool.
Removal of entire fleece if *black wool* is called.

Shed Staff :
Diligent performance of duties.
Remove stain/dag on the board.
Tidy work habits.

(b) Again, candidates failed to show any depth of knowledge regarding processes involved in obtaining the objective measurement of vegetable matter, fibre diameter, staple strength, grease content and coefficient of variation of staple length. The following points should be considered:

VM
From the scoured oven-dry sample take 40g and place in a boiling solution of 10% caustic soda (sodium hydroxide).
Stir for 3 minutes.
Neutralise with water.
Catch in a sieve, oven dry and weigh.
T = wt. VM/40g x 100.

FD
A 10-20g scoured oven-dry sample is put through a Shirley Analyser to remove vegetable matter, knots. Conditioned (20°C Å2°C, 65% RH Å2% RH) for 4 hours. Then 2, 2.5g plugs are placed in an Airflow machine, each sample measured twice. Average the 4 readings - the result must fall within certain tolerances.

Staple Strength
The display sample is put through a mechanical tuft sampler where up to 66 tufts are selected (need minimum 40 staples for SS). From each of these tufts 1 staple is selected, placed in a tray and conditioned for 8 hours at 20°C Å2°C and 65% RH Å2% RH. The staples are then measured on the ATLAS machine and the results reported in Newtons (force to break the staple)/Kilotex (thickness of the staple).

Grease Content
From the scoured oven-dried sample, 10g is placed in a SOXHLET device and washed with 95% ethyl alcohol for 20 cycles or 2 hours. Grease residue is collected in a flask.
E = Wt Grease/10g x 100.

C of V Staple Length
Staples prepared from the MTS machine as above Part 2. Individual staples measured on the ATLAS machine for staple length mm (minimum 55 staples). The computer program calculates the variation of each staple from the mean.
Coefficient of Variation = SD/Mean x 100.