|  |  |  |  |
| --- | --- | --- | --- |
| **Month** | **Season** | **Key Diseases / Issues** | **Management Tasks & Recommendations** |
| **June** | Monsoon Start | Pneumonia, Foot Rot, Enterotoxaemia, Parasites (worms, ticks, lice) | - Vaccinate against enterotoxaemia - Deworm all sheep - Apply footbath (copper sulfate) - Spray for lice and ticks - Keep shelters dry and clean |
| **July** | Monsoon Peak | Pneumonia, Foot Rot, Worms, Mange | - Continue regular deworming - Inspect and treat foot rot - Maintain dry bedding and shelter ventilation - Monitor breathing & cough signs |
| **August** | Monsoon | Parasite infestation, Pneumonia | - Repeat deworming as needed - Check for external parasites and treat - Avoid overcrowding to reduce stress and infection spread |
| **September** | Late Monsoon | Enterotoxaemia, Worms, Respiratory issues | - Boost vaccination if needed - Continue parasite control - Prepare shelter for upcoming dry season |
| **October** | Post-Monsoon | Tick-borne diseases (Theileriosis, Anaplasmosis), Respiratory issues | - Begin tick control programs (dips, sprays) - Provide mineral supplements - Vaccinate if required - Monitor respiratory health |
| **November** | Post-Monsoon | Parasite control, Nutritional deficiencies | - Maintain deworming schedule - Supplement feed with minerals and vitamins - Prepare for colder months |
| **December** | Winter Start | PPR, Orf, Pneumonia, Bluetongue, Mastitis | - Vaccinate for PPR and Bluetongue - Isolate and treat infected animals - Provide warm, dry shelter - Regular udder checks for ewes - Improve nutrition with quality fodder |
| **January** | Mid-Winter | Same as December | - Continue vaccination and health monitoring - Maintain warm shelter and clean bedding |
| **February** | Late Winter | Respiratory diseases, Hypothermia risk | - Monitor closely for pneumonia - Provide protection from cold and damp - Prepare for upcoming summer stress |
| **March** | Early Summer | Heat stress, Flystrike, Dehydration | - Provide shade and clean water - Use insecticides and fly repellents - Feed mineral supplements - Monitor hydration levels |
| **April** | Summer | Heat stress, Nutritional deficiencies | - Continue heat stress prevention - Supplement diet with concentrates - Maintain parasite control |
| **May** | Late Summer | Same as April | - Prepare for monsoon by checking shelter drainage - Continue fly and parasite control - Adjust feeding to maintain body condition |

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**sheep-diseases-farmers-guide**

PDF (pir.sa.gov.au)

**sheep-diseases-the-farmers-guide**

PDF ([www.sheepconnectsa.com.au](http://www.sheepconnectsa.com.au))

|  |  |  |
| --- | --- | --- |
| **Disease** | **Symptoms** | **Prevention** |
| **BACTERIAL DISEASES** | | |
| Anthrax | Sudden fever and death Dark color bloody discharge from the natural orifice such as nose, anus and vagina | Vaccination once in a year in affected area Disposal of carcass either by burying or burning Don’t open the carcass as the germ spread through air |
| Haemorrhagic Septicemia | Fever, dysentery, swelling of lower mandible and death More occurrence in rainy season | Vaccinate the animal once in a year before onset of rainy season |
| Brucellosis | Abortion during late pregnancy, infertility, scrotal swelling in male, joint swelling | Disposal of dead foetus and placenta Use gloves while handling infected items as it affect human beings |
| Enterotoxaemia | Sudden death in young growing kids. Mucous diarrhea may also seen during death | Vaccinate the animals once in a year before the onset of monsoon Don’t feed on young grass |
| Pneumonia | Fever, respiratory distress, mucous discharge from nostril, reduced feed intake and weight gain, cough | Clean water, well ventilated house |
| Foot rot | Wound in foot region | Keep the animal in dry clean house |
| Mastitis | Swelling of udder, change in milk | Clean shed, wash the udder with disinfectant solution |
| **VIRAL DISEASES** | | |
| Peste Des Petits Ruminants (PPR) | Fever, Occular and nasal mucous discharge, mouth lesion, respiratory distress | Yearly vaccination Separation of infected one from healthy animals |
| Foot and Mouth Disease | Fever, wound lesion in foot and mouth, excess salivary secretion, difficult in walking | First vaccination at 3rd moth and then once in 4-6 months interval |
| Goat pox | Fever, Occular and nasal mucous discharge, respiratory distress, pox lesion in un hairy parts such as lips, thigh udder etc | Yearly vaccination (Optional) |
| **Endo-parasitic diseases** | | |
| Fluke infection | Emaciation, anaemia, edema in lower jaw | Control of snails, avoid grazing in early morning and late evening, deworming of animals periodically |
| Tape worm | Reduced growth, fever, kid mortality | Deworming of animals periodically |
| Round worm | Fever, anaemia, edema in lower jaw, reduced growth | deworming of animals periodically |
| Coccidiosis | Blood tinged brownish diarrhea, anaemia, kid mortality | Clean house, spray of 10% ammonia solution, administration of anticoccidial drugs |
| **Ecto-parasitic infestation** | | |
| Tick, lice etc | Reduced growth, skin allergy and wound | Clean house, periodical dipping |

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| --- | --- | --- | --- |
| **Disease** | **Symptoms** | **Prevention / Vaccine** | **Treatment** |
| **1. Enterotoxaemia** (Pulikampa / sudden death) | Sudden death, bloat, diarrhea, convulsions | **Vaccination** at 1.5 months & annually | Not treatable after onset; prevent with vaccine |
| **2. Foot and Mouth Disease (FMD)** | Mouth ulcers, lameness, drooling | **Vaccine every 6 months** (Feb & Aug) | Potassium permanganate wash, supportive care |
| **3. PPR (Goat Plague)** | Fever, nasal discharge, mouth sores, diarrhea | **Vaccination at 3 months**, then every 3 years | Fluids, antibiotics for secondary infections |
| **4. Sheep Pox** | Skin nodules, fever, discharge from nose | **Vaccination annually** | No specific cure; isolate and give antibiotics |
| **5. Blue Tongue** | Swelling of face, fever, lameness, ulcers | Avoid vector bites; no vaccine available in all areas | Supportive care, clean wounds |
| **6. Pneumonia** | Coughing, nasal discharge, fever, weakness | Good ventilation, avoid cold drafts | Antibiotics (e.g., Oxytetracycline) |
| **7. Foot Rot** | Lameness, foul smell, pus in hoof | **Dry flooring**, footbath weekly | Zinc sulfate/ copper sulfate footbath, trimming |
| **8. Mastitis** (in ewes) | Swollen udder, pain, reduced milk | Keep udders clean; milk hygienically | Intramammary antibiotics |

**Comparison of High-Yielding Fodder Crops**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feature** | **CO-4 Napier** | **CO-5 Napier** | **4G Bullet (Super Napier)** | **Desmanthus (Hedge Lucerne)** |
| **Parentage** | Cumbu CO 8 × Napier FD 461 | **Bajra IP 20594 × Napier FD 437** | King Grass × Super Napier (claimed) | ***Desmanthus virgatus*** (legume species) |
| **Release/Origin** | TNAU, 2008 | TNAU, 2012 | Private sector (recent) | Naturalized; used in India, Australia, South America |
| **Green Fodder Yield** | 155–160 t/acre/year | 160–165 t/acre/year | Up to 300 t/acre/year (claimed) | 80–100 t/acre/year (under optimal conditions) |
| **Crude Protein (%)** | **8–11%** | **14–15%** | **16–18% (claimed)** | **18–24%** |
| **Dry Matter (%)** | **21.3%** | **22%** | **~22–24% (claimed)** | **~22–25%** |
| **Leaf-Stem Ratio** | High; soft, juicy | High; soft, juicy | Very high; soft, highly palatable | High; shrubby, fine stems, leafy |
| **Palatability** | High | Very high | Very high | High for all ruminants |
| **Cutting Interval** | 35–40 days | 45 days | 30–35 days | 45–60 days after first cut at ~75–90 days |
| **Regrowth Speed** | Fast | Very fast | Very fast | Moderate to fast (improves after first cut) |
| **Propagation** | Slips only | Slips only | Slips/rhizomes only | Seeds (treated/inoculated); also self-regenerates |
| **Special Features** | Disease resistant, robust | Higher protein/yield, better digestibility | Marketed for higher protein/yield | Legume; fixes nitrogen, drought-tolerant, suitable for intercropping |
| **Independent Validation** | Yes (TNAU) | Yes (TNAU) | Limited independent data | Yes (research institutions, CSIRO, IGFRI) |

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| --- | --- | --- |
| **Feature** | **Desmanthus (Hedge Lucerne)** | **Napier Hybrids (CO-4 / CO-5 / 4G Bullet)** |
| **Type** | **Legume** (Nitrogen-fixing shrub) | **Grass** (Perennial C4 hybrid grass) |
| **Protein Content** | **High:** 18–24% | **Moderate to High:** 8–18% (CO-4: ~10%, CO-5: ~14–15%, 4G: ~16–18% claimed) |
| **Yield (Green Fodder)** | 80–100 t/acre/year | 155–300 t/acre/year (4G > CO-5 > CO-4) |
| **Dry Matter (%)** | ~22–25% | 21–24% |
| **Palatability** | High (especially goats and sheep) | Very high (all ruminants) |
| **Leaf-Stem Ratio** | High; shrubby, leaf-rich | Very high; soft, juicy |
| **Regrowth Speed** | Moderate to fast (after establishment) | Very fast (30–45 days between cuts) |
| **Drought Tolerance** | **Excellent** – grows in low rainfall (500–800 mm/year) | **Moderate** – prefers irrigation or high rainfall zones |
| **Soil Fertility Contribution** | **Improves soil (fixes nitrogen)** | **Depletes soil nutrients unless supplemented** |
| **Propagation** | Seeds (easily sown, needs Rhizobium) | Vegetative (slips or cuttings only) |
| **Management Needs** | Low input, hardy, good for bunds/intercropping | High input, needs irrigation, fertility, and regular cutting |
| **Suitability** | Dryland, marginal land, mixed pastures | Irrigated/high-input systems, stand-alone grass |
| **Anti-Nutritional Factors** | Low tannins (generally safe) | None significant |
| **Pest/Disease Resistance** | Generally good; few issues | Good, but susceptible to leaf spots under poor drainage |
| **Cutting Interval** | 45–60 days (after first cut at ~75–90 days) | 30–45 days |

## 

**Complete Feeding Guidelines by Body Weight for Sheep**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Body Weight (kg)** | **Napier Grass (kg/day)** | **Desmanthus (kg/day)** | **Concentrate Mixture (g/day)** | **Mineral Mixture + Salt (g/day)** | **Total Fresh Fodder (kg/day)** | **Clean Drinking Water** | **Feeding Purpose** |
| **15–20 kg** (Young Lamb) | 0.8–1.0 kg | 0.5–0.6 kg | 150–200 g *(optional)* | 10 g | **~1.3–1.6 kg** | Free access | Growth and early development |
| **25–30 kg** (Growing Sheep) | 1.5 kg | 1.0 kg | 200 g *(recommended)* | 12–15 g | **~2.5 kg** | Free access | Moderate weight gain, muscle growth |
| **35–40 kg** (Adult Ewe/Ram) | 2.0 kg | 1.2 kg | 150–200 g *(for lactating/working animals)* | 15 g | **~3.2 kg** | Free access | Maintenance, reproduction, or lactation |

**Component Roles Explained**

|  |  |
| --- | --- |
| **Component** | **Purpose** |
| **Napier Grass (CO-4/CO-5/4G)** | Bulk roughage, fiber, energy source |
| **Desmanthus (Hedge Lucerne)** | High protein legume; supports growth, reproduction, milk |
| **Concentrate Mixture** | Optional energy/protein boost – useful during:  • Rapid growth phases  • Late pregnancy/lactation  • Breeding or fattening |
| **Mineral Mixture + Salt** | Prevents deficiency of Ca, P, Zn, Cu, etc.; improves feed utilization |
| **Water** | Essential for digestion, especially with fiber-rich diets; sheep need **3–6 liters/day** on average |

**Forage Feeding Rotation Plan for Sheep (Napier + Desmanthus)**

**Best Practice: Feed in Order of Nutritional Priority + Palatability**

|  |  |  |
| --- | --- | --- |
| **Time of Day** | **Forage to Offer** | **Why This Order Works** |
| **Morning (6–8 AM)** | **Desmanthus (Hedge Lucerne)** | - High protein helps kickstart digestion  - Sheep prefer softer, leafy legumes when hungry  - Increases rumen microbial activity |
| **Midday (12–2 PM)** | **Napier Grass (CO-4/CO-5/4G)** | - Good bulk fodder for mid-day feeding  - Keeps sheep full and satisfied  - Higher fiber slows down digestion to balance the morning protein |
| **Evening (4–6 PM)** | **Mixed Feed (Napier + Desmanthus chopped together)** | - Mixing improves overall intake  - Prevents selective feeding  - Good for slow overnight digestion |
| **Night (optional)** | **Small Concentrate (if used)** | - Optional: For growing or lactating animals  - Provides additional energy before rest |

Feeding Tips Based on Preference & Behavior

|  |  |
| --- | --- |
| **Tip** | **Explanation** |
| **Start with Desmanthus** | Sheep prefer leafy, soft forage; more likely to eat protein-rich fodder when hungry |
| **Alternate bulk and protein** | Helps balance rumen pH and improves digestibility |
| **Chop and mix** | Mixing Napier + Desmanthus (1:1 ratio) increases uniform intake and reduces waste |
| **Avoid feeding only Napier first** | Sheep may fill up on bulkier fodder and ignore the protein-rich Desmanthus |
| **Offer clean water always** | Especially after feeding Napier, which is fibrous and may increase thirst |

Why Sheep May Eat Less or Get “Bored”

|  |  |  |
| --- | --- | --- |
| **Cause** | **Effect** | **Example** |
| Same forage every day | Decreased appetite | Only Napier daily — they start ignoring it |
| Same texture | Preference for leafy or soft parts only | Stems left behind |
| Low variety in diet | Poor rumen stimulation | No legumes or roughage balance |
| Overripe/mature fodder | Tough and unpalatable | Old Napier cuts are fibrous and dry |

**Rotate Fodder Types Weekly**

Instead of giving the **exact same ratio daily**, rotate the base feed:

|  |  |  |
| --- | --- | --- |
| **Day** | **Main Feed** | **Supplement** |
| Monday | Napier | Desmanthus |
| Tuesday | Desmanthus | Napier |
| Wednesday | Mixed (1:1 Napier + Desmanthus) | None |
| Thursday | Napier | Gliricidia / Tree leaves (if available) |
| Friday | Desmanthus | Sweet potato vines / Cowpea leaves |
| Saturday | Mixed | Small amount of concentrate |
| Sunday | Light feed + Rest | Water + mineral lick |

### ****Mix or Chop to Create Texture Variety****

* Chop both Napier and Desmanthus into **different sizes** — coarse and fine
* Add **molasses** or **bran** (100–200 g per head) occasionally for flavor
* Alternate **fresh green vs. semi-wilted** feed to vary chewing effort

### ****Add Natural Flavors or Herbs****

* Occasional leaves of **Neem (young leaves)**, **Tulsi**, or **legume vines** can improve palatability and digestion
* **Salt lick blocks** with trace minerals also stimulate appetite

**Molasses or Bran in Sheep Diets – Detailed Guide**

**Molasses (Blackstrap or Sugarcane Molasses)**

|  |  |
| --- | --- |
| **Aspect** | **Details** |
| **What it is** | Thick syrup by-product from sugar processing (rich in sugar & minerals) |
| **Why use it** | Sweet taste boosts intake; provides quick energy (carbohydrates) |
| **Feeding Rate** | **100–150 g/day/head**, maximum **200 g** for adult sheep |
| **How to Feed** | - Mix with chopped Napier or Desmanthus  - Can dilute with water (1:1) and pour over dry feed  - Ideal for dry season or when feed is coarse |
| **Benefits** | - Increases feed intake  - Reduces dust in dry feed  - Supplies potassium, iron, magnesium  - Encourages shy feeders |
| **Caution** | Overfeeding (>200 g/day) can cause **acidosis** or diarrhea; always balance with fiber |

**🌾 2. Wheat Bran / Rice Bran**

|  |  |
| --- | --- |
| **Aspect** | **Details** |
| **What it is** | Outer layer of wheat or rice kernel; rich in fiber and moderate protein |
| **Why use it** | Adds bulk and mild flavor; helps bind mixed feeds |
| **Feeding Rate** | **100–200 g/day/head** |
| **How to Feed** | - Mix with molasses or water to form a mash  - Combine with chopped forages and offer in trough |
| **Benefits** | - Improves digestibility  - Adds some protein (~12–14%)  - Reduces feed waste (acts as binder) |
| **Caution** | Ensure bran is **fresh** and free from mold or rancid smell |

### Daily Supplement Amount per Sheep:

* Molasses: 100–150 g
* Wheat/Rice Bran: 100 g
* Water: Enough to make a moist mash (approx. 0.5–1 liter per 10 sheep)

### Quantities for Different Flock Sizes (per day):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Flock Size** | **Molasses (kg)** | **Bran (kg)** | **Water (liters)** | **Total Mix (kg approx.)** |
| 10 sheep | 1.2 kg | 1.0 kg | 5–7 | ~2.2–2.5 |
| 20 sheep | 2.4 kg | 2.0 kg | 10–14 | ~4.4–4.8 |
| 50 sheep | 6.0 kg | 5.0 kg | 25–35 | ~11–12 |

### Preparation Steps:

1. **Measure molasses and bran** according to flock size.
2. In a large container, **mix molasses and bran** thoroughly.
3. Gradually add **clean water** to form a moist, sticky mash — not too wet or runny.
4. Offer the mash **fresh once or twice daily** in a trough or shallow container.
5. **Monitor intake** and adjust water or quantities as needed.

Mineral Mix for Sheep: Essential Guide

### Why Mineral Mix is Important

* Sheep require **trace minerals and macro minerals** beyond what they get from forage.
* Mineral deficiencies can cause:
  + Poor growth
  + Low fertility
  + Weak immunity
  + Bone disorders (e.g., rickets)
  + Reduced wool and meat quality

### Tips for Mineral Feeding Success

* Always provide **clean, fresh drinking water** alongside minerals.
* Introduce minerals **gradually** if sheep are not used to them.
* Store mineral mixes **in dry, cool place** to prevent spoilage.
* Use a **balanced mineral mix specific for sheep** — avoid cattle mineral mixes, as sheep have different requirements (especially copper).
* In areas with **known mineral deficiencies**, consider soil and forage testing and supplement accordingly.

**Key Minerals Needed by Sheep**

|  |  |  |  |
| --- | --- | --- | --- |
| **Mineral** | **Role** | **Sources in Feed** | **Common Deficiency Signs** |
| **Calcium (Ca)** | Bone formation, milk production | Legumes, minerals | Weak bones, poor growth, milk drop |
| **Phosphorus (P)** | Energy metabolism, bone health | Concentrates, minerals | Rickets, poor fertility |
| **Sodium (Na)** | Electrolyte balance | Salt (NaCl) | Reduced appetite, poor growth |
| **Magnesium (Mg)** | Enzyme activation, nerve function | Forage, minerals | Grass tetany, nervousness |
| **Sulfur (S)** | Protein synthesis | Protein feeds, minerals | Reduced growth, wool defects |
| **Zinc (Zn)** | Skin, hoof health, enzyme function | Mineral mix | Skin lesions, poor wool quality |
| **Copper (Cu)** | Red blood cells, immune system | Trace mineral premix | Anemia, swayback in lambs (too low or too high!) |
| **Manganese (Mn)** | Bone development, reproduction | Mineral mix | Poor fertility, skeletal abnormalities |
| **Selenium (Se)** | Antioxidant enzyme, muscle health | Mineral premix | White muscle disease, poor immunity |

**Typical Composition of a Commercial Sheep Mineral Mix (%)**

|  |  |
| --- | --- |
| **Mineral** | **Percentage (%)** |
| Calcium (Ca) | 18–22% |
| Phosphorus (P) | 4–6% |
| Sodium (Na) | 15–20% (from salt) |
| Magnesium (Mg) | 1–2% |
| Sulfur (S) | 0.3–0.5% |
| Zinc (Zn) | 1200–2000 ppm |
| Copper (Cu) | 100–300 ppm |
| Manganese (Mn) | 500–1500 ppm |
| Selenium (Se) | 1–3 ppm |
| Others (Iron, Cobalt, Iodine) | Trace amounts |

**How to Feed Mineral Mix to Sheep**

|  |  |  |
| --- | --- | --- |
| **Method** | **Description** | **Typical Dose (per head per day)** |
| **Loose mineral mix** | Mix into concentrate or feed trough | 10–15 g daily |
| **Free-choice mineral** | Place in a separate trough or block | Sheep lick as needed (30–50 g/day voluntary) |
| **Mineral blocks** | Solid lick blocks with minerals | Sheep lick at will |

**Weekly Feeding Schedule for Sheep Flocks:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Feed Component** | **Daily Amount per Sheep** | **Total for 10 Sheep** | **Total for 20 Sheep** | **Total for 50 Sheep** |
| **Napier Grass (fresh)** | 1.5 kg | 15 kg | 30 kg | 75 kg |
| **Desmanthus (fresh)** | 1.0 kg | 10 kg | 20 kg | 50 kg |
| **Molasses + Bran Mash** | Molasses: 125 g Bran: 100 g (total ~225 g mash) | Molasses: 1.25 kg Bran: 1.0 kg Water: ~6 L | Molasses: 2.5 kg Bran: 2.0 kg Water: ~12 L | Molasses: 6.25 kg Bran: 5.0 kg Water: ~30 L |
| **Mineral Mix** | 12 g | 120 g | 240 g | 600 g |

**Weekly Quantities (7 days)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feed Component** | **10 Sheep** | **20 Sheep** | **50 Sheep** |
| Napier Grass (fresh) | 105 kg | 210 kg | 525 kg |
| Desmanthus (fresh) | 70 kg | 140 kg | 350 kg |
| Molasses | 8.75 kg | 17.5 kg | 43.75 kg |
| Bran | 7.0 kg | 14.0 kg | 35.0 kg |
| Water (for mash) | ~42 L | ~84 L | ~210 L |
| Mineral Mix | 0.84 kg | 1.68 kg | 4.2 kg |

**Daily Feeding Schedule with Timings for Sheep**

|  |  |  |  |
| --- | --- | --- | --- |
| **Time** | **Feed Offered** | **Quantity per Sheep** | **Purpose / Notes** |
| **7:00 AM** | Fresh Desmanthus (Hedge Lucerne) | 1.0 kg fresh | High protein start of the day, stimulates intake |
| **11:00 AM** | Fresh Napier Grass (CO-4/CO-5) | 1.0 kg fresh | Bulk fiber and energy, keeps rumen active |
| **2:30 PM** | Molasses + Bran Mash | ~225 g mash (molasses + bran + water mix) | Energy boost, improves palatability and feed intake |
| **5:30 PM** | Mixed chopped Napier + Desmanthus | 0.5–1.0 kg fresh | Balanced fiber & protein, prevents feed boredom |
| **All Day** | Mineral Mix | 10–15 g (free choice or mixed in feed) | Provides essential trace minerals |
| **All Day** | Clean Fresh Drinking Water | Free access | Essential for digestion and health |