Deer Feeding Tables

How to calculate how much to feed

How much to feed and the quality needed

Feeding the right amount of feed of the appropriate quality at the right time is a key to profitable production. Farmers who do this understand the influence of the changing seasons on feed intake and levels of performance.

As a general rule, feeding to maximise growth rates in young deer results in greater overall efficiency (kg of product grown per kg of feed eaten). If an animal is slow growing it not only takes longer to be finished to a prime weight, overall it uses more of its feed for maintenance and less for growth.

Photo: Simone Hoskin

There may be bulk feed and some clover in this pasture, but it is mostly made up of aged and dry/dead grass tillers which have low feed value and are slow to digest

The language of feeding

All feed budgets and grazing management practices start from understanding both the quantity and quality of feed required to meet performance goals.

Feed requirements: The feed required by an animal depends on its age, sex, reproductive state, the season, growth potential and breed type. The content of the feed can be broken down into energy, protein, minerals and vitamins. Feed requirements are described in terms of how much feed actually goes down the throat for utilisation by the animal.

Utilisation: This is the proportion of total feed actually used by the animal compared to what is available. The balance, which includes the residual left after grazing, may be trampled, soiled or otherwise left uneaten. For example, 80% utilisation means that for every 5 kg of feed available, 4 kg is actually eaten by the animal.

Actual utilisation rates depend on environmental conditions (generally lower if wet and muddy), the nature of the feed, and grazing management practices (e.g. the residual – how much is left behind). Utilisation can also impact on the quality of the feed actually eaten by an animal. For example, a low utilisation rate will allow animals to pick out only the highest quality components of a pasture sward, whereas a high utilisation rate means the animals are forced to eat most of the material presented.

If the grazing residual is low and utilisation is high, animals will be forced to eat poorer quality plant components (e.g. stems), reducing the average overall quality of the material actually eaten. If the grazing residual is higher (e.g. grazing from 2500 kg dry matter (DM) down to a 1500 kg DM residual) then the animal can utilise a higher proportion of the feed offered without being forced to eat lower quality plant components.

Key points

- **Use these Deer Feeding Tables to work out how much feed different classes of deer need at different times of the year.**
- **The tables take into account 'feed utilisation'. This is the amount of feed that goes down the throat to be used by the animal compared to what is offered to them.**
- **Assuming deer have the quantity of feed they need, energy is generally the most limiting factor for deer performance in NZ pasture-based farming systems. This is why feed quality is usually measured on the basis of how much metabolisable energy it contains.**
- **Deer feed requirements can also be calculated using the free DEERFeed Intake and Allocation calculator, see www.deernz.org/deerhub/feeding**

Feed allowance: This is the feed put in front of the animal. It includes the feed to be eaten and the feed not utilised, including any residual. For example, if an animal's feed requirement is 4 kg (of dry matter and a certain feed value or ME that describes feed quality), and utilisation is 80%, then a feed allowance of 5 kg is required to allow the animal to meet its feed requirement.

Feed quality: In this context we are talking about the concentration of energy in the feed (as energy is generally the most limiting factor for deer performance). It is measured as mega-joules (MJ) of metabolisable energy (ME) – or energy the animal can extract from the feed, per kg of dry matter (DM). DM is the non-water component of the plant.

In broad terms, feed quality in typical NZ pastures normally ranges from 8 (very poor) to 12 (very high quality) MJ ME/kg DM. It might be as high as 13.5 in some carbohydrate-based forage crops (e.g. swede or fodder beet bulbs).

Photo: Richard Hilson

This high quality pasture, which contains a good proportion of legumes and herbs, will be high in energy. (Probably around 11-11.5 MJME/kg DM.) Energy is generally the most limiting factor for deer performance (so long as adequate quantity is available)

Yearlings on a good pick of around 1700 kg DM of early spring pasture

Best growth rates are likely when deer have unlimited access to quality pasture. This allows them to pick and choose what they eat without being forced to graze down into the base of the sward.

The ideal is to put deer onto pasture at 2500 kg DM/ha then remove them at 1500 kg DM/ha. The drawback is that the total utilisation of the pasture under such a regime is low.

One solution is to follow deer in the rotation with beef cows, a good class of stock to graze covers down to lower levels. This better utilises the feed available and improves pasture quality for future grazings by deer. Beef cow body condition can fluctuate without impacting greatly on their profitability. Another option is to follow R1 deer with mature hinds or stags at times when they require maintenance feeding only.

Pre-grazing pasture mass: The total kg of forage (in dry matter terms) per hectare. Not all of this mass is available to the animal. Even when grazed as low as the animals possibly can (with detrimental impacts on performance) there will generally be between 700 to 900 kg of dry matter left behind.

The residual (or post-grazing pasture mass): The total kg of forage (DM per hectare) left behind when animals are shifted. This is important as it determines how much the deer can eat on the last day(s) in the break. Where the residual is too low, the deer's intake will have been reduced due to limited ability to harvest available plant material for a period of time. Low residuals also mean that limited leaf area is left behind, which can reduce subsequent pasture growth rates.

Feed intake: The quantity (in kg of DM) of feed actually eaten by the animal (per day). Intake is primarily determined by either the capacity of the animal to harvest feed (which depends on feed availability and is influenced by the residual) or the capacity of the animal to process feed (higher quality feeds take less time to digest, and therefore pass through the animal quicker, allowing the animal to eat more).

Energy intake: The amount (mega joules) of metabolisable energy taken in by the animal (MJME). This is simply the feed intake (kg DM) multiplied by the feed quality (MJ ME/kg DM). Because feed quality affects both the kg of feed eaten and the amount of energy in each kg of feed, it has a double multiplier effect on energy intake. This is why high feed quality is so important for achieving high levels of animal performance.

Calculating the number of days of grazing before shifting

Follow these steps to find out how to use the Deer Feeding Tables on the opposite page.

1. Specify what performance you are targeting from a stock class. For example, you might target a growth rate of 250 g/day in a group of young stags weighing 80 kg. See the DINZ growth curves http://deernz.org.nz/deer-growth-curves to help set seasonal growth targets.
2. Look up the relevant feed allowance from the table. This example results in a feed allowance of 3.2 kg DM/day.
3. Estimate the pre-grazing pasture mass (we'll say 2500 kg DM for this example) and determine the residual you will graze to (say 1500 kg DM).
4. If you think you will waste a lot of the feed provided (i.e. muddy conditions, high stocking rates) then adjust the kg DM/head/day up.

   The current figure allows for 15% wastage of the feed offered (i.e. 85% utilisation).
5. Calculate the number of days that the animals will take to graze to this residual based on number of animals per hectare. The example below gives a result of 10 days.

$$\frac{\text{Feed available per ha}}{\text{Feed demand per ha}} = \frac{\text{Pregrazing pasture mass - postgrazing residual}}{\text{No. deer per hectare x feed allowance}} = \frac{\text{2500-1500 kg per ha}}{\text{30 x (weaners divided by ha) x 3.2kg DM/day}} = \frac{1000}{96} = 10 \text{ days}$$

DEER FEEDING TABLES

The Deer Feeding Tables help take the guess work out of feeding. The tables below give the *feed allowances* for young (<18 months) deer for a given liveweight and growth rate. The figures make an allowance for utilisation.

The feed allowances below assume high feed utilisation i.e. 85%. This occurs in conditions where pastures are not muddy and are lightly stocked, with grazing to higher residuals (e.g. 1500+ kg DM). The blue cells represent the maximum performance in winter, where growth is restricted by changes in photoperiod.

Deer Feeding Table A (Young stags)

Feed intake in kg DM/day required for different growth rates and liveweights, for young stags. Assumes a high (85%) utilisation rate of the feed offered from when deer go on to the pasture and when deer come off.

Current liveweight	Growth rate (g/day)										
	0	50	100	150	200	250	300	350	400	450	500
40	1.3	1.5	1.7	1.9	2.1	2.3	2.4	2.6	2.8	3.0	3.2
50	1.6	1.8	1.9	2.1	2.3	2.5	2.7	2.9	3.1	3.3	3.4
60	1.8	2.0	2.2	2.4	2.5	2.7	2.9	3.1	3.3	3.5	3.7
70	2.0	2.2	2.4	2.6	2.8	3.0	3.1	3.3	3.5	3.7	3.9
80	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.5	3.7	3.9	4.1
90	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.7	3.9	4.1	4.3
100	2.6	2.8	3.0	3.2	3.4	3.6	3.8	3.9	4.1	4.3	4.5
110	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.1	4.3	4.5	4.7
120	3.0	3.2	3.4	3.6	3.8	4.0	4.1	4.3	4.5	4.7	4.9
130	3.2	3.4	3.6	3.8	4.0	4.1	4.3	4.5	4.7	4.9	5.1
140	3.4	3.6	3.8	4.0	4.1	4.3	4.5	4.7	4.9	5.1	5.3

Blue cells represent maximum performance levels during winter (mid-May to mid-August)

This table gives the feed allowance for feeding young stags, based on the animal's feed requirement and expected utilisation factors for feeds. A feed quality of 11 MJ ME/kg DM is used in these calculations.

For average quality feed (10 MJ ME/kg DM) add 10%, or low-quality feed (9 MJ ME/kg DM) add 22% to these allowances. Conversely for very high-quality pasture (12 MJ ME/kg DM) subtract 9%, or for carbohydrate-based feeds (grain or forage crop bulbs - 13 MJ ME/kg DM) subtract 15%. Upper end growth rates are unlikely to be achieved on average or low-quality feeds.

Deer Feeding Table B (Young hinds)

Feed intake in kg DM/day required for different growth rates and liveweights, for young hinds. Assumes a high (85%) utilisation rate of the feed offered from when deer go on to the pasture and when deer come off.

Current liveweight	Growth rate (g/day)										
	0	50	100	150	200	250	300	350	400	450	500
40	1.2	1.4	1.6	1.9	2.1	2.4	2.6	2.8	3.1	3.3	3.6
50	1.4	1.6	1.8	2.1	2.3	2.6	2.8	3.1	3.3	3.5	3.8
60	1.6	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.7	4.0
70	1.8	2.0	2.2	2.5	2.7	3.0	3.2	3.4	3.7	3.9	4.2
80	1.9	2.2	2.4	2.7	2.9	3.1	3.4	3.6	3.9	4.1	4.4
90	2.1	2.4	2.6	2.8	3.1	3.3	3.6	3.8	4.1	4.3	4.5
100	2.3	2.5	2.8	3.0	3.3	3.5	3.7	4.0	4.2	4.5	4.7
110	2.5	2.7	3.0	3.2	3.4	3.7	3.9	4.2	4.4	4.6	4.9
120	2.6	2.9	3.1	3.4	3.6	3.8	4.1	4.3	4.6	4.8	5.0
130	2.8	3.0	3.3	3.5	3.8	4.0	4.2	4.5	4.7	5.0	5.2

Blue cells represent maximum performance levels during winter (mid-May to mid-August)

Why are stag and hind feed requirements different?

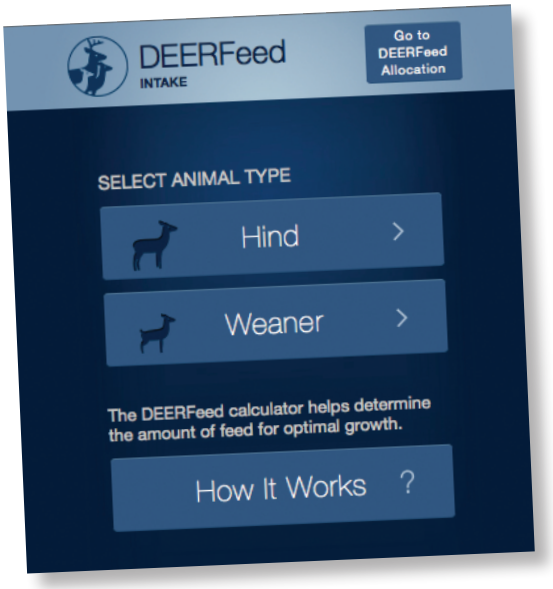
When calculating feed requirements, there are usually two main components: maintenance (the feed needed to simply maintain the animal with no weight gain) and the additional feed needed for growth. Stags are generally slightly leaner than hinds. Lean tissue requires less energy to deposit than fat tissue, but requires more energy to maintain, leading to differences between stags and hinds.

Where do the values in the tables come from?

The feeding equations these tables are based on come from Nicol and Brooks (2007) 'The metabolisable energy requirements of grazing livestock' in *Pasture and Supplements for Grazing Animals, Occasional Publication 14* – New Zealand Society of Animal Production. These values are derived from experiments establishing deer nutritional requirements conducted over many years.

The information is available on the DINZ Deer Hub, www.deernz.org/deerhub/feeding

Example of the DEERFeed calculator



The DEERFeed calculator was developed by Dr David Stevens, AgResearch (Invermay) and Marie Casey, PGG Wrightson, with funding from DINZ, the NZDFA and key partner MPI through the Sustainable Farming Fund.

The calculator uses the same parameters as the Deer Feeding Tables. Go to www.deernz.org/deerhub/feeding.

Seasonal feeding

As well as allocating feed based on animal gender, weight and age, the season is another factor to consider. This is because deer growth is regulated by daylight hours, with the shorter days causing a depression in appetite. The high growth rates possible in spring to autumn will not be achieved in winter.

The seasonal change is represented in the tables with colour coding. Please note that the upper end of the winter growth rates (in blue) are generous and are unlikely to be regularly achieved.

For more on seasonality, see the ***Deer Fact*** 'Working with the seasons to maximise deer profit'.

It's important to provide quality feed at maintenance levels plus enough to cover wastage or just above, to ensure young deer aren't losing weight or are under nutritional stress or at risk of health problems.

If you see deer leaving more residues of bulk feed behind that you were expecting, it's highly likely that the food quality is at fault (particularly energy levels i.e. ME value). It is unlikely to be a result of deer being overfed and not wanting anymore.

More >>

Deer Fact: Working with the seasons to maximise deer profit

Deer Fact: Feeding hinds for maximum fawn growth

Deer Fact: Growing weaners faster with better autumn feeding

Deer Fact: Feeding for optimal velvet production

Deer Fact: Drought feeding and management

The DEERFeed calculator: www.deernz.org/deerhub/feeding

DINZ growth curves: www.deernz.org/deer-growth-curves

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