

Feed Type	Tasty?	Feed Ad Lib? ¹	Energy Is Mainly Present As	Protein? ²	Fat? ³	Fibre? ⁴	Main Reason To Feed?	Limitations/Problems?
Molasses	✓	✓	Sugars (sucrose)	✗	✗	✗	Sugar to complement low sugar levels and improve utilisation of nutrients in rest of diet. Make other feeds tastier	Upper limits to feeding or risk of rumen acidosis, is NOT a feed to fill a large feed deficit. Low protein if diet is protein deficient. Price perception problems with many farmers and consultants
Pasture - Winter/Spring	✓	✓	Fibre / Protein	✓✓✓	✓✓	✓✓	Provides low cost bulk feed	Not enough pasture vs what is needed by stock. High quality grass may be too high in water, protein and low in fibre vs stock requirements. Nitrate toxicity when conditions are high risk. Inconsistent quality
Pasture - Summer	✓ but not if poor quality / high endophyte	✓	Fibre / Protein	✓✓ (can be lower)	✓✓	✓✓✓	Provides low cost bulk feed	Not enough pasture vs what is needed by stock. Grass may be poor quality (low energy and protein) vs stock requirements. Hard for stock to graze effectively if quality is poor. High endophyte grass causes ryegrass staggers and heat stress. Inconsistent quality
Turnips	✓ once adapted	✗	Sugars / Protein	✓✓	✗	✓	Provides low cost bulk feed of high quality if grass quality/quantity poor	Limit to 1/3 of diet for lactating cows or ideally 1/2 of diet for non-lactating stock. Acidosis risk, rape scald or tryptophan toxicity
Hominy	✓ best mixed with silage	✗	Starch	✗	✓	✓	As a high quality source of energy for stock provided largely as starch	Very high quality, rumen acidosis is a risk at higher rates of feeding. Should be mixed with e.g. silage and fed on feedpad for best utilisation. Price and availability may limit uses
Grass silage	Variable	✓	Fibre / Protein	✓ or ✓✓	✓	Variable ✓✓	Provides a bulk of (often) home grown feed to fill a feed deficit	Not always as cheap as seems with poor utilisation. Highly variable quality. Health problems for stock if poorly made. Low protein / energy for stock with a high performance expectation
Lucerne silage	Variable	✓	Fibre / Protein	✓✓	✓	Variable ✓✓	Provides a bulk of feed to fill a feed deficit. If well made, can be better quality than grass silage	Highly variable quality depending on cut date and ensiling technique. Needs an inoculant
Cereal silage	Variable	✓	Fibre / Starch	✓	✓	Variable ✓✓✓	Provides a bulk of feed to fill a feed deficit, especially where starch is needed but maize silage not an option	Highly variable quality depending on cut date and ensiling technique. More variable quality than maize. Narrow harvest window. Low Ca, Mg, Na but not as low as maize silage
Maize silage	Variable	✓	Fibre / Starch	✗	✓	✓✓	Provides a bulk of a starchy silage to fill a feed deficit. Better than cereal silage usually	Quality can be variable with cut date/ensiling technique. Silage face must be well managed at feedout; aerobically unstable. Low Ca, Mg, Na
Meadow hay	Usually	✓	Fibre	✓	✓	✓✓✓	Provides a bulk of feed to fill a feed deficit, not as good quality as well made grass silage. Useful fibre source, tastier than straw	Quality is typically too poor for lactating stock as large part of diet. Risk of stock health problems if hay is baled wet or bales get wet subsequently. Availability can be a problem some years
Cereal straws	Variable	✓	Fibre	✗	✗	✓✓✓	Bulky fibrous feed for wintering stock and/or balancing very high quality feeds	Limited feed value in its own right. Only use as fibre source. Quality and availability problems some years, often overpriced
Proliq etc	Variable but usually good	With care	Sugars (lactose)	✗	✗	✗	As an energy source for lactating cows, a cheap source of MJME	High water content, ash and sugars. Rumen acidosis risk. Supply problems some years and supply is highest when demand is lowest by herds. High K = metabolic disease risk
Barley grain	✓ once adapted	✗	Starch	✗	✗	✓ or ✗	Energy source and source of DM for stock. Readily available most years	Risk of acidosis at higher feeding rates. Variable quality. Needs silo and grain rolling facilities
Wheat grain	✓ once adapted	✗	Starch	✗	✗	✗	Energy source and source of DM for stock. Readily available most years and higher MJME than barley. Can be soda grain treated	Higher risk of acidosis than for barley. Extreme care when feeding. Quality variation. Needs silo and grain rolling facilities. Feed out mixed with silage on feedpad or preferably fed in-shed
Maize grain	✓ once adapted	✗	Starch	✗	✓	✗	Energy source and source of DM for stock. Higher MJME and better starch characteristics than wheat or barley. The premium grain	Risk of acidosis at higher rates. Price issues some years, competing with the pig and poultry market. Small risk of mycotoxins some years, though less important for cattle than pigs and poultry. Quality variation. Needs silo and grain rolling facilities
Standard dairy meal	✓ once adapted	✗	Starch / Fibre	✗ can get high protein	✗	✗ or ✓	Energy source and source of DM for stock. Can be purchased in pellet form, utilisation can be better than processed grain fed out in paddock	Huge variation in quality between and within suppliers. Get what you pay for - many cheap meals are filled with poor quality bulk ingredients. Needs storage facilities silo or storage in bags under cover

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Broll	✓	✓	Fibre	✓✓	✓	✓✓✓	Energy source and source of DM for stock. Doesn't cause rumen acidosis. Readily accepted by stock	High fibre, may be an issue if diet already full of very fibrous feeds. Fine texture – needs to be fed in feedpad or troughs for good utilisation. Variable availability and price. Needs good storage facilities
Palm kernel extract	✗ to start with, ✓ once adapted	✓	Fibre / Fat / Protein	✓✓	✓✓	✓✓✓	Energy source and source of DM for stock. Doesn't cause rumen acidosis, good levels of fat for animal performance. Currently cheap.	Unpalatable until stock get used to it. Fine texture, needs to be fed on feedpad or troughs or trailers for good utilisation. Needs good storage facilities. Upper limit to feeding levels or problems with fat overload in rumen
Copra	✓	✓	Fibre / Protein	✓✓✓	✓	✓✓✓	Energy source and source of DM for stock. Doesn't cause rumen acidosis, good levels of protein for animal performance	Price and availability variation. Fine texture unless buy as pellets, wastage high if fed in paddock. Don't need extra protein unless in protein deficient situation (e.g. winter milk, poor quality summer grass). Needs good storage facilities
Brewers grains	✓	✓	Fibre / Protein	✓✓✓	✗	✓✓✓	Energy and protein source. No rumen acidosis, quality of protein is high (bypass) good for milk production. Low DCAD for springer feed	Price and availability variation. Hard to store for long periods. High water content makes cartage costs expensive on DM basis. Risk of mycotoxins due to moulding. High fibre may limit intake if rest of diet is very fibrous. Good quality protein may strip cow body condition if diet contains insufficient energy
Onions	✓ once adapted	✗	Starch	✓	✗	✓	Energy source as starch, balancer for pasture and grass silage. Cheap opportunity feed	Narrow seasonal supply. Hard to store for long periods. High water content makes cartage costs expensive on DM basis. Risk of SMCO toxicity, choking, rumen acidosis and milk taint in lactating cows
Apple pomace	✓	✗	Starch / Sugar / Pectins / F fibre	✓	✓	✓✓✓	Energy source, can be cheap opportunity feed. Pectins make this a very valuable feed if the price and availability is right. Can be ensiled	Seasonal supply only. Risk of acidosis and mycotoxins. High water content makes cartage costs expensive on DM basis. Contracts are hard to get in some districts. Spoilage a problem if carried (may ensile)
Grape pomace	✓	✓	Fibre / Fat / Protein	✓✓	✓✓	✓✓✓	Energy source. On paper is poor quality but stock can do very well on this (fat content?)	Very poor quality with high fibre and lignin - can't feed much as big part of diet. Availability is very seasonal, contracts not available in all districts. Spoilage a problem if carried (may ensile)
Potatoes	✓ once adapted	✗	Starch	✓	✗	✗	Energy source, balancer for pasture and grass silage. Well managed, stock do very well	Seasonal supply. Risk of rumen acidosis is high. Poisoning from green potatoes. Choking. Acidosis main problem with potatoes, low upper limit to feeding levels, extreme care is needed
Carrots	✓ once adapted	✗	Sugars	✓	✗	✗	Energy source but not as starch, balancer for pasture and grass silage. Stock do well on carrots	Seasonal supply and not as readily available as e.g. potatoes. Risk of acidosis. Choking (not as bad as potatoes). High water content can make cartage costs expensive on DM basis
Sugar by-product	✓	✗	Sucrose	✗	✗	✗	Energy source as sugar, balancer for pasture and grass silage. Excellent feed if available	Irregular supply and price. Very high risk of acidosis. Poor utilisation without a feedpad
Squash	✓ Need to teach cattle to break open	✗	Starch / Sugar – ratio changes as squash softens	✓	✗	✗	Energy source as starch/sugar, balancer for pasture and grass silage	Seasonal supply only. Risk of acidosis. Spoilage/don't carry well especially if damaged. Utilisation is poor until stock learn how to get into squash
Whole cotton seed	✓ OK; best mixed with other feeds	✓	Fibre / Fat / Protein	✓✓✓	✓✓	✓✓✓	Excellent feed if available providing fermentable fibre, fat and protein	High levels cause rumen dysfunction (fat). Price and availability highly variable. Most is GMO. Risk of spray residues. Gossypol toxicity if fed at higher rates, especially to calves
Soybean meal	Time needed to get used to it	✓	Protein / Fibre	✓✓✓	✓✓	✓	Used as protein source for protein deficient diets. Good energy source. No acidosis	Expensive. Fine texture, needs to be blended with other feeds. Protein feeds not often needed in NZ
Urea	✗ must mix with other feeds	✗	No energy, just a source of Non-protein nitrogen (NPN)	✓✓✓ (NPN, not protein)	✗	✗	Used as protein source for low protein diets. Rumen bugs turn urea into bug protein for digestion. Helpful for salvaging poor quality and very low protein feeds	High risk of toxicity if not mixed well/mix rates are wrong. Must be fed with molasses. Stock must be adapted onto urea over 3 weeks. Never as good as true protein. Maintenance option only for stock

¹ Ad Lib means ad libitum, that is, can cows be allowed access to this feed as much as they'd like, with no restrictions on how much they can eat? ✓ = yes, can allow cattle unrestricted access under most conditions; ✗ = Do NOT allow cattle unrestricted access to this feed.

² Crude Protein Approximate Guide: ✗ = CP less than 7%; ✓ = 7-12% CP; ✓✓ = 13-18% CP; ✓✓✓ = 19% or more CP

³ Fat Approximate Guide: ✗ = less than 2.0%; ✓ = 2-5%; ✓✓ = 6-10%; ✓✓✓ = 11% or more fat

⁴ Fibre Approximate Guide: NDF: ✗ = less than 15%; ✓ = 16-30%; ✓✓ = 31-50%; ✓✓✓ = 50% or higher