tips&tools

ANIMAL PRODUCTION

Using BeefSpecs to help meet market specifications

The MLA BeefSpecs calculator is an electronic tool that assists producers to meet target market specifications on time. The keys to meeting market specifications are to understand the specifications and customer requirements, to assess and monitor the progress of your animals, to manage the grazing system or use high quality finishing systems, to seek feedback and to evaluate marketing options regularly[1].

Key benefits

- Learn how to use the BeefSpecs calculator to explore factors that affect fat deposition (and therefore fat thickness) at a future point in an animal's growth path.
- Determine if and what management changes might be needed to alter that growth path and assist a greater proportion of animals to meet market specifications.

Market specifications

Current market specifications for beef cattle are primarily based on carcase weight and rump (or P8) fat thickness (see Figure 1).

BeefSpecs is an easy to use tool that allows you to explore the factors that affect fat deposition (and therefore fat thickness) at a future point in an animal's growth path. You can use this information to determine if and what management changes are needed to alter that growth path, thereby assisting a greater proportion of your animals to meet market specifications.

In BeefSpecs, market specifications can be defined for trading stock (eg preparation of feeder cattle) or for the slaughter of finished cattle. For trading stock, BeefSpecs estimates P8 fat thickness. For slaughter cattle, BeefSpecs can estimate hot standard carcase weight (HSCW) and P8 fat thickness.

The capacity of healthy live cattle to achieve target weight and fatness specifications is determined by breed/genotype (as assessed by frame score), sex, nutrient (feed) intake, the production system and use of hormone growth promotants (HGPs).

BeefSpecs predicts final P8 fat thickness and HSCW, using information on the relationships between current liveweight, fat (P8) thickness, frame score and the projected future growth rate of cattle. It takes account of the type of production system (ie feedlot or pasture), feed (ie grass or grain) and where applicable, the HGP being used. BeefSpecs allows you to understand how you can change these factors to better achieve a target market specification.

You can download BeefSpecs to your computer from the MLA website www.mla.com.au/beefspecs or use it online.

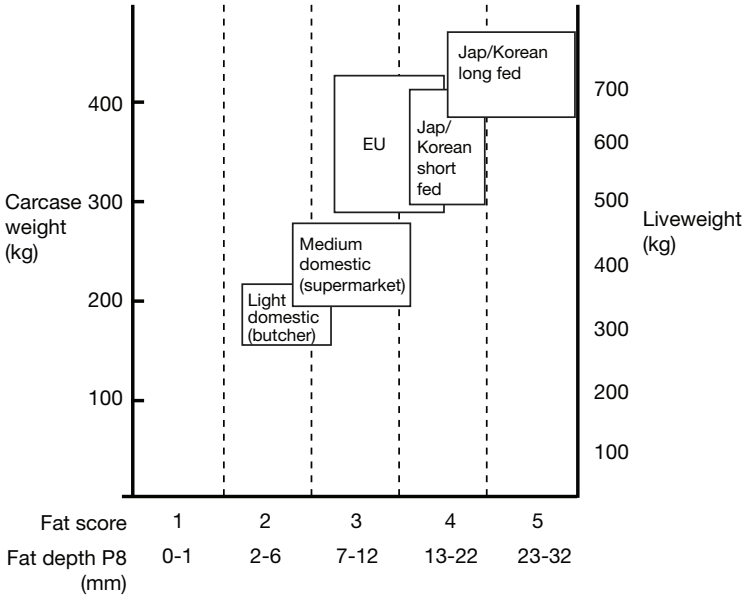

Figure 1 Target carcase range, liveweight range and fatness attributes (ie fat score and P8 fat thickness) for Australian beef cattle markets. Source: T Andrews and B Littler (2007). Market specifications for beef cattle, Primefact no. 621, NSW Department of Primary Industries, Orange. www.dpi.nsw.gov.au/agriculture/livestock/beef/market/publications/beef-market-specifications

[1] MLA (Meat & Livestock Australia) (2004). *MLA More Beef from Pastures — The Producer's Manual*, MLA, Sydney.

What does BeefSpecs look like and what does it do?

When you open BeefSpecs, you will see three tabs labelled ‘Animals’, ‘Management’ and ‘Performance’ — and a green ‘Results’ section on the right hand side of the screen.

You can click on each of the tabs to input the following relevant information:

- Animals — initial liveweight, initial P8 fat thickness, average frame score of the group, sex and breed type. If you know average hip height and age you can input that information directly.
- Management — HGP status (implanted and type), feed type and production system
- Performance — anticipated average growth rates, number of days between now and target date, and estimated dressing percentage.

As you change your inputs in each tab, you will see relative changes in final liveweight, P8 fat thickness and HSCW in the Results section.

As you scroll across the titles of each input field a ‘pop up box’ appears with information about the required inputs. If you input values outside the range a pop up box appears reminding you of the allowable range. You must enter a value in the allowable range (see Table 1).

Table 1: Acceptable range and unit values of numerical inputs used in BeefSpecs

Input	Units	Minimum	Maximum
Initial liveweight	kg	175	550
Initial P8 fat depth	mm	2	11
Frame score	–	3	9
Estimated dressing percentage (DP%)	%	50	65
Days on feed	days	25	225
Estimated average daily gain (ADG)	kg/hd/day	0.2	2.0

After inputting information about your cattle in the Animals tab, you can explore the effects of management and performance options by changing values in the Management and Performance tabs.

Animals tab

On the Animals tab, you can input information related to the current or initial status of the group of cattle that you want to assess (see Figure 2).

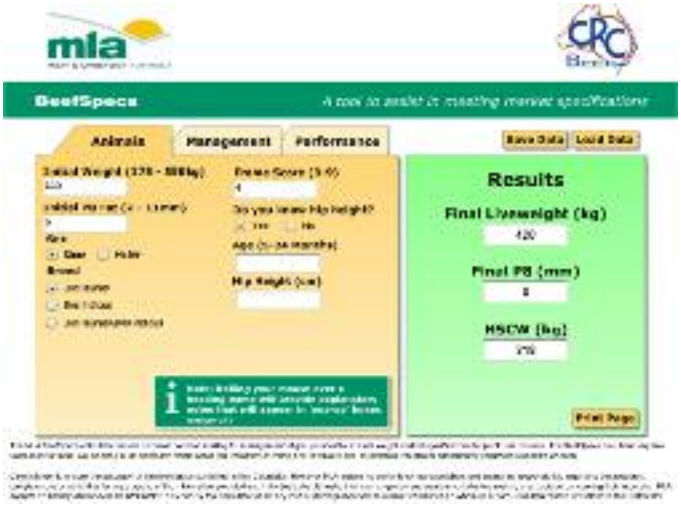

Figure 2: The on-screen display of the ‘Animals’ tab in BeefSpecs, which is used to input information about the current status and specifications of your cattle

Initial weight (kg)

Obtain the initial weight (in kilograms) of the group of animals by weighing them all, or at least a representative sample of the group.

Initial P8 fat

Estimate the initial (or starting) rump (P8) fat thickness of the group of animals. P8 fat thickness can be measured directly using ultrasound methods or converted from a fat score appraisal using Table 2.

Table 2: Relationship between fat score and estimated P8 fat thickness (mm)

Fat score	P8 fat depth (mm)
1	0–2
2	3–6
3	7–12

Note: BeefSpecs is designed for young growing cattle and does not support an initial P8 fat thickness greater than 11mm.

Further information on fat scoring and estimating fat thickness is available on the NSW Department of Primary Industries website www.dpi.nsw.gov.au/agriculture/livestock/beef/appraisal/publications/assessment-fatness-cattle

Sex

The relative rates of muscle and fat deposition differ between male and female cattle, and whether or not they have been castrated. BeefSpecs allows for the specific prediction of carcase parameters of steers or heifers. BeefSpecs is not suitable for predicating the carcase attributes of bulls.

Breed Type

Select the breed **type** (as opposed to breed) that best describes the animals you are assessing. Breed types may be either Bos *indicus* (eg; Brahman animals or breed derivatives) or Bos *taurus* (British or European breeds), or a combination of the two. For composite or crossbred animals, select the breed **type** that makes up 7/8th (88%) or more of their breeding. For those animals comprising less than 7/8th (88%) of one breed **type**, select the "Bos *taurus* x Bos *indicus*" radio button.

Frame score

TYPICAL FRAME SCORE	MARKET SUITABILITY: LIGHT DOMESTIC	MEDIUM DOMESTIC	HEAVY DOMESTIC / EU	SHORT FED EXPORT	LONG-FED EXPORT	MATURITY TYPE
						Early maturing—small frame ▪ Generally short in all skeletal dimensions (breadth and length). ▪ Tend towards lower retail beef yield and/or DP%. ▪ Lack rapid growth potential but can still show good muscle expression. ▪ Generally reach market potential at lower carcase weights (eg; 150–180kg HSCW / 9–12mm P8 fat).
						Moderate maturing—average frame ▪ Average growth potential rising to good growth for frame 5s. ▪ Generally good length of body and, particularly in British breeds, can have good muscle development. ▪ Generally reach market potential at ~200–350kg HSCW and 9–12mm P8 fat.
						Late maturing—large frame ▪ Much larger cattle with high growth potential and % lean. ▪ Non-continental breeds of this size generally lack muscle expression. ▪ Reach market potential much later at carcase weights of 350–450kg with 9–12mm of fat. ▪ Suitable for long fed feedlot markets pending structural soundness, muscling potential and marbling propensity.
						Very late maturing—very large frame ▪ Huge cattle with extreme growth potential, and usually extremely lean. It is doubtful if animals of this size will achieve enough fat for any quality market.

Figure 3: Frame score, suitability for markets and maturity type attributes of beef cattle (adapted from NSW Department of Primary Industries).

Green = Middle of range, attributes more likely to occur.
Yellow = End of range, attributes less likely to occur.

www.dpi.nsw.gov.au/livestock/beef/appraisal/publications/frame-scoring

Frame score is graded on a 1 to 9-point scale, with '1' being the smallest, lowest mature body weight animals and '9' being the largest, highest mature body weight types. Most British breeds will fall into the 1–7 range for frame score and most continental breeds will fall into the 4–9 range.

Estimate the frame score for each group of cattle that you want to assess. Frame score is an estimate of the relative size of cattle (see Figure 3).

Frame score is estimated from the hip height of an animal at a known age. If you know the animal's hip height and its age when hip height was measured, click the 'Yes' button. BeefSpecs will then ask you to insert the age (months) and hip height (cm) and calculate frame score automatically. If you answer 'No', then enter frame score directly.

Management tab

On the Management tab, you can input information related to the management of the group of cattle that you want to assess (see Figure 4).

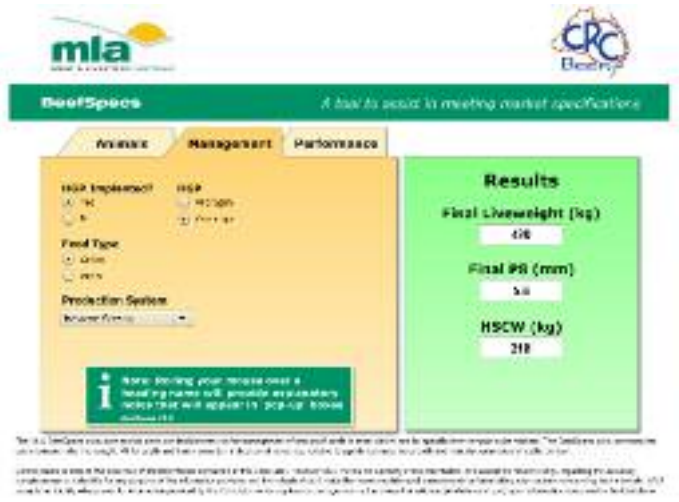

Figure 4: The on-screen display of the 'Management' tab in BeefSpecs, which is used to input information about how your cattle have been managed

HGP Implanted

Hormone growth promotants (HGPs) increase growth rates in cattle. Some types of HGPs may also reduce the relative rate of fat deposition (eg androgen-based HGPs).

Use the following guide to help select the correct answer for the 'HGP Implanted' field.

Select the 'Yes' button (and adjust estimated ADG by + 10% in the Performance tab) if your cattle have been implanted and are within the effective life (or payout period) of an HGP.

If you have selected yes, an additional radio button will appear asking if you have used Androgenic or Oestragenic implants.

Androgenic implants include the following products*:

- Revalor S / G / H
- Synovex-Plus / H
- Progro TE-S / TE-H / H
- Component TE-S / TE-H / TS / TH / H

* Correct at March 2009

Oestragenic implants include the following products:

- Synovex-S / C
- Progro-S
- Compudose 100 / 200 / 400
- Ralgro

A complete list of HGP implants and their composition is available on the MLA BeefSpecs website page www.mla.com.au/beefspecs.

Feed type

Choose one of the following options that best describes the type of feed offered or planned for the production period:

- 'Grain' – a concentrate-based diet with greater than 70% grain content
- 'Grass' – a roughage-based diet with greater than or equal to 70% pasture/roughage content.

If you select the Grain button, BeefSpecs will automatically display 'Feedlot/Strip Grazing' in the 'Production System' field to stipulate confined feedlot or opportunity feedlot conditions.

Production System

Select the type of production system that best describes the grazing or feeding environment of your group of cattle. You can use this drop-down list to adjust for the animals' relative workload to acquire feed. The most important attribute is the workload involved in walking to feed and water. Choose from:

1. Feedlot/strip grazing — walking only short distances (less than 1km/day), such as in a feedlot or strip grazing situation.
2. Easy grazing — walking less than 10km/day, such as situations where cattle have easy access to water and good quality feed. You can also choose this option if you use self feeders in the paddocks.
3. Moderate grazing — walking 10–20km/day, such as extensive grazing of flat country with modest feed availability and quality, and cattle walking up to several kilometres to water.
4. Hard grazing — walking greater than 20km/day, such as situations where cattle are in larger paddocks, hilly terrain and paddocks with comparatively sparse, lower quality feed and/or with substantial distances between watering points.

   There is no simple relationship between the amount of work in walking due to paddock size, quality and availability of feed, and distance to water. These broad production system categories are suggestions that cover a range of possibilities, and your judgement of the distance that cattle walk in a day is the best indicator of workload.

Performance tab

On the Performance tab, you can input information related to the production performance of the group of cattle that you want to assess (see Figure 5).

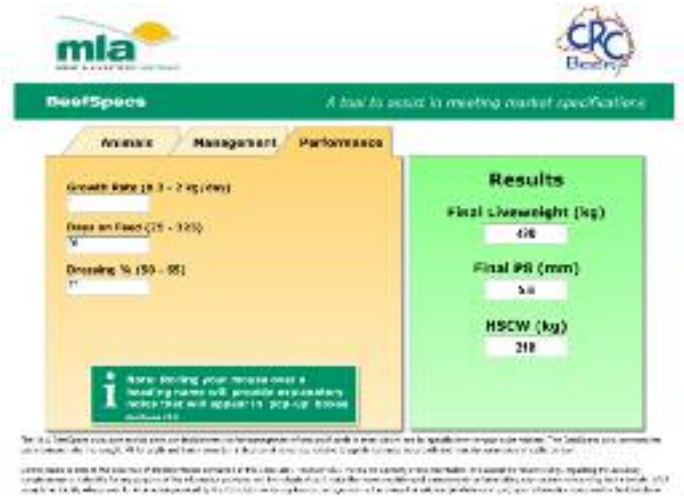

Figure 5: The on-screen display of the 'Performance' tab in BeefSpecs, which is used to input information about the performance of your cattle

Growth rate

Estimate of the average daily gain (ADG) of the group of animals over the period you wish to consider. Estimates of ADG should be based on information derived from your own property for the expected growth rate of cattle in the production systems that you normally use. If you are using HGP implants, increase the ADG by 10% over non-implanted cattle (see 'Management tab', above).

Note

To understand how these variables affect target specifications you can use BeefSpecs to explore the ADG required across the group to achieve a target liveweight and fatness outcome. Set the initial liveweight, frame score, P8 fat thickness and days on feed, then alter ADG and, if necessary, the production system inputs.

BeefSpecs does not provide information on how to achieve a target growth rate. It is best to use local advice and/or modeling programs such as GrazFeed® to estimate the amount and quality of feed or supplements required to achieve a target growth rate.

Days on feed

Insert the length of the grazing or feeding period that you wish to consider (minimum 25 days, maximum 225 days).

Dressing %

Estimate dressing percentage for the group of cattle that you want to assess. BeefSpecs uses this figure to estimate HSCW from the predicted liveweight. Default values are 52% and 54% for grass- and grain-based diets, respectively. You can alter the default values based on your own records.
Information on likely dressing percentages for different cattle and production systems is available at on the NSW Department of Primary Industries website www.dpi.nsw.gov.au/agriculture/livestock/beef/appraisal/publications/dressing-percentages-cattle

Results section

In the Results section, you will see changes in liveweight, P8 fat thickness and HSCW relative to changes in other BeefSpecs variables.

Final liveweight

This is the calculated liveweight at the end of the specified feeding or grazing period. It is derived solely from your specified inputs for initial liveweight, ADG and the length of the feeding or grazing period.

Final P8

This is the predicted rump (P8) fat thickness for your specified inputs. It is derived from a prediction of fat deposition based on the animal's growth path and relative state of maturity.

HSCW

This is the calculated weight of the dressed carcase trimmed to AUS-MEAT standard specifications. It is derived from the final liveweight and the estimated dressing percentage.

BeefSpecs is designed to demonstrate how your management decisions affect fat thickness and the suitability of your cattle for market. It was originally developed using data on *B. taurus* steers grown under feedlot conditions but it has been extended to account for production in pasture-based systems and is applicable for both steers and heifers of *B. taurus* or *B. indicus* breed types.

Data Saving and Loading

Data entered under the "Animals", "Management" and/or "Performance" tabs can be saved at anytime by pressing the "Save Data" button in the top right hand corner of the screen. Users can subsequently upload and refine and/or add to the saved data by pressing the "Load Data" button upon re-entering BeefSpecs.

A worked example

You know that your Angus steers (B. *taurus* breed type) are currently 320kg and, on average, they have 3mm P8 fat and frame score 5. At present, they have not been implanted and they are grazing under moderate conditions (ie 10–20 km/day estimated distance walking). You anticipate that they will grow at 1 kg/day for the next 120 days.

The BeefSpecs calculator estimates that these cattle will weigh 440kg, have 6.2mm P8 fat and 229kg HSCW at the end of 120 days.

You might be happy with this if you are targeting a feedlot, but if you wanted to see where they might fit into a slaughter market, you could explore some options. You might consider increasing growth rate to 1.5kg/day (by improving grazing management and pasture availability). To assess this change in BeefSPecs you can make the following alterations:

- increase ADG to 1.5kg/day in the Performance tab
- change the Production System to 'Easy grazing' in the Management tab.

At 120 days, BeefSpecs now estimates that the cattle would weigh 500kg, have 11.8mm P8 fat and 260kg HSCW.

If you thought you could sustain that same growth rate for 180 days, you could increase Days on Feed to 180 days in the Performance tab. BeefSpecs now estimates that the cattle would weigh 590 kg, have 15.3 mm P8 fat and 307 kg HSCW.

Perhaps you want to use an androgen-based HGP to reduce the time to achieve an estimated HSCW of 300kg? You would need to alter the variables as follows:

- select the 'Yes' radio button for 'Implants' in the Management tab
- increase estimated ADG by 10% to 1.65kg/day in the Performance tab
- adjust Days on Feed in the Performance tab until you achieve the desired HSCW of 300kg.

BeefSpecs will now show that you could reduce the length of the feeding period to 155 days to achieve a target HSCW of 300kg and that the P8 fat thickness in this scenario would be 12.5mm.

Appendix

*Table 3: Hormonal growth promotants registered for use in Australia and their principle active compound (androgen and/or oestrogen)**

Trade name	Principal active compound
Progro H	Androgen
Synovex H	Androgen
Progro T-S	Androgen
Progro TE-S	Androgen
Revalor S	Androgen
Synovex with Trenbolone Acetate	Androgen
Progro TE-H	Androgen
Revalor-H	Androgen
Compudose-G	Androgen
Revalor-G	Androgen
Revalor-I	Androgen
Progro S	Oestrogen
Synovex S	Oestrogen
Compudose 100	Oestrogen
Compudose 200	Oestrogen
Compudose 400	Oestrogen
Ralgro	Oestrogen

* As at March 2009

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Further information

To find out about other MLA publications visit www.mla.com.au/publications, email publications@mla.com.au or phone MLA on 1800 675 717.

The MLA BeefSpecs calculator assists producer decision making for management of groups of cattle to meet weight and fat specifications for particular markets. The BeefSpecs calculator requires users to input initial liveweight, P8 fat depth and frame score (an indication of frame size relative to age) to estimate the growth and maturity parameters of cattle on-farm.

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