

## Integration of on-farm silage systems for enhanced beef cattle production

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**Abstract:** *With increasing climate variation, livestock producers are required to safeguard their enterprises to stay viable. On-farm silage systems that harvest fodder crops are becoming more relied upon as a management practice to manage seasonal variability, reduce overgrazing of pasture and decrease the age of turnoff, whilst increasing live weight gains of cattle. This paper is a producer's account of the benefits of developing an on-farm silage system, from growing the fodder through to feeding it to livestock and the enhancements to profitability and environment it brings.*

**Key words:** silage, profit, opportunity, sustainability

### Introduction

Futuraity Shorthorns is a beef seedstock and cattle trading business. The seedstock section supplies live animals and genetics throughout Australia and internationally. The cattle trading operation is an opportunity-based business that is flexible by design to allow variations in stocking rate.

The farming operations are in north-western NSW with “Glen Ayr” and adjoining holdings totalling 2550 ha located near Kenebri in the Warrumbungle Shire and on “Raeburn” consisting of 1520 ha located 30 km east of Coonamble in the Coonamble Shire. The properties have been purchased over a 20 year period by Jason and Kylie Catts and operated by Jason and Kylie and two full-time employees.

### Farm description

#### *Soils, landscape and climate*

Soil types are quite varied ranging from sandy loams, red clays and self-mulching basalt. The topography of the land consists of slightly undulating to open plains country, with areas of scattered timber. The annual average rainfall is 600 mm with a slight summer dominant distribution.

#### *Livestock*

The seed stock business consists of 400–500 registered breeding females with the aim to produce 100 bulls for sale annually. Steers and cull heifers are taken through to export feeder weights. The cattle trading business focuses on

lighter weight cattle grown on to export feeder weights or finished for domestic or grass-fed markets. Numbers are dependent on available paddock feed or stored fodder, this allows for flexibility of stocking rate.

#### *Pastures and/or forages for livestock*

All properties have a mixture of native, subtropical and lucerne-based pastures. Both winter and summer forages are grown for grazing with 400 ha of oats or forage barley grown in the winter and 250 ha of sorghum or cowpea grown in the summer. Excess is chopped for silage.

#### *Cropping*

Cereal and pulse crops (240 ha) are grown in winter for silage and grain production for on-farm use. The cropping program is designed to produce fodder as well as to set up favourable agronomic outcomes when establishing perennial pastures.

#### *Drought strategies*

Like many producers, drought strategies are continually evolving in our operation. To date we have implemented the following:

- 500 head drought mitigation/opportunity feedlot; and
- 3000 t silage bunker capacity to be increased to 4500 t fresh chopped.

This allows flexibility in stocking rates, by running at 70% of stocking rate with breeder cattle and using trading cattle to increase stocking when fodder supply allows. Also, this enables us to store high levels of moisture in the fallow farming country prior to planting to increase the likelihood of successful cropping outcomes.

## Goals or business objectives

Supply genetics to beef producers that add value and profit to the beef cattle supply chain. Further, reduce the effects of variable climatic conditions on forage supply. Reduce farm debt.

## The swing back to forages

Over the past ten years, Futurity Shorthorns has developed a silage system by direct chopping forage crops to make pit silage to use as part of our annual management of livestock. The benefits of integrating on-farm silage production have been wide-reaching and added a lot of value to many sections of the business.

### *Agronomic*

When direct chopping cereal crops for silage, in our case, there have been several agronomic improvements that stem from cleaning and early harvest. As crops are chopped four to six weeks earlier than if the crop was to be taken through to grain, the chopping process cleans most weeds from the field prior to weeds seeding and allows an earlier start to a fallow period for moisture storage. This early finish to the cereal crop chopped for silage can allow for a sooner subsequent crop or at least better starting moisture than if the crop was to be taken through for grain or hay. In cases where lucerne is undersown in the cereal crop, the early finish of the cover crop once chopped for silage allows more favourable establishment conditions due to reduced weed competition and less draw on subsoil moisture.

### *Hay-silage comparison*

There is little doubt that a mixture of hay and silage feeding is appropriate for most operations although there are some tangible cost savings, improvements in feed quality and proficiency in feed delivery that have led us to include silage as our major component when feeding cattle. As silage is chopped near its peak nutritional value and with reduced losses through the drying and harvesting process, silages are generally higher in digestibility, crude protein, metabolisable energy value and palatability than hay cut from the same crop.

When we compare the cost of making hay versus silage there are some cost-savings on

a dry matter base. A common price for silage chopped, carted to the pit, rolled and the cost of plastic to cover is \$26/t. The average dry matter (DM) for cereal crops direct chopped for silage is generally 40%, which results in a cost of approximately \$64/t DM.

Common hay baling costs \$37.50/bale including cutting and raking. With the hay having a dry matter content of 90% brings the cost to \$68.75/t for 600kg bales. Plus \$5 cartage back to the stack gives a total of \$73.75/t DM.

When you take into consideration superior nutritional value, reduced harvest cost and a lot lower risk of crop damage during harvest, directly chopped silage stacks up well. Chopped silage has the advantage of not needing processing when fed through a mixing wagon compared to hay that requires processing. Silage greatly reduces mixing time and wear and tear on machinery. Although, a bale of hay is more mobile than a pit of silage. When the feeding of larger numbers of cattle in confined spaces is required to protect ground cover, silage offers greater time savings.

### *Environment*

Due to operating a seedstock business, we are unable to sell all the stock when drought conditions occur due to not being able to replace them with like quality. Protection of ground cover and pastures are imperative for the sustainability of our country. A well planned on-farm silage system allows weaning of calves at any age and have them moving forward. If conditions deteriorate, breeding stock can be fed in a mitigation feedlot or finished for slaughter, thereby saving pastures from overgrazing and erosion of soil.

### *Increased profits from silage feeding*

I would like to share a few key concepts that by having an on-farm silage system allows producers to do.

**Take advantage of highs in the market.** Every year there are highs and lows in the market (Fig. 1). By not being totally reliant on the weather for production, producers can have sale stock hitting the market in peak periods or purchase in a soft market.

If there is insufficient paddock feed in the autumn, calves can be weaned early and then by using silage based diets calves are able to gain 1–1.5 kg/day post-weaning until fodder crops are ready to graze. Producers can take advantage of higher prices in late winter-early spring preceding the spring turn-off cattle. This practice greatly reduces the age of turn-off and reduces stocking rates without reducing kilograms of turn-off.

**Take advantage of lows in the market.** Most years at the start of winter the weaner market is depressed (Fig. 1). Having silage systems in place allows for the purchase of stock at much-reduced rates. Silage based diets can supply high average daily gain (e.g. Table 1) and low cost of gain. Thus making the feeding component of cattle trading profitable even without an upside in the trade, but combining both can bring substantial rewards.

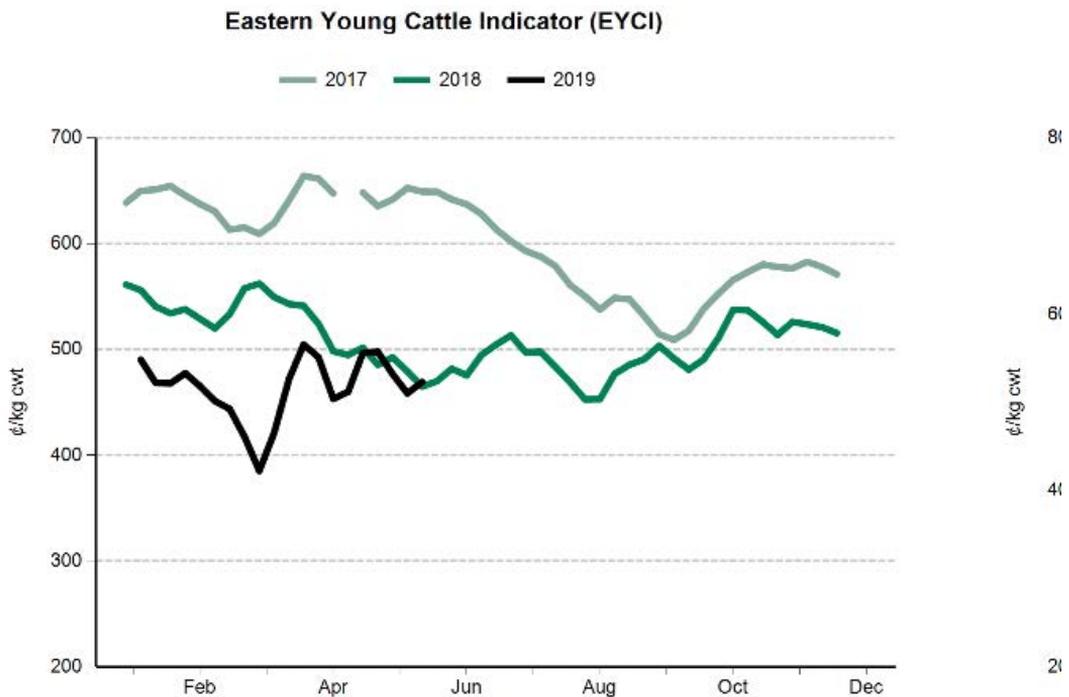


Figure 1. Eastern young cattle indicator demonstrating annual market trends (source: MLA 2019).

Table 1. Steer live weight gain and feed conversion were better on diets based on silage produced from ryegrass/subclover pasture with various levels of concentrate (source: Kaiser *et al.* 2004 adapted from Jacobs and Zorrillo-Rios 1994).

Concentrate in diet (% liveweight)*	Hay (5.6 t DM/ha)			Silage (5.0 t DM/ha)		
	0.5	1.0	1.5	0.5	1.0	1.5
DM intake (kg/day)						
Forage	4.36	3.86	2.82	4.99	4.26	3.58
Concentrate	1.39	2.90	4.47	1.45	2.94	4.39
Total	5.75	6.76	7.29	6.44	7.20	7.97
Liveweight gain						
kg/day	0.33	0.63	0.88	0.81	1.09	1.20
kg/t feed DM	57	93	121	126	151	151

\* Concentrate comprised 67% barley, 30% lupins and 3% minerals.

**Have the herd ready for breeding.** Feeding post-weaned heifers a silage ration ensures they maintain good growth rates and retained heifers reach adequate weights prior to their joining date.

### Conclusions

On-farm silage harvest offers agronomic advantages by the way of earlier moisture conservation and reducing weed burden. There are savings in direct chopping silage over hay as well as the increased nutritional value of the fodder and less weather risk during crop harvest. By having the option to rapidly reduce stocking rates in paddocks, a silage system allows protection of ground cover and ultimately reduces soil loss or erosion. Crops or pastures offer lower-risk production. However, by having the option of feeding silage-based diets to young cattle either, bred or purchased, when the season

requires can allow producers to take serious market advantages.

### Acknowledgments

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