

Ridley Enrich SowBlock

Technical Dossier

Environmental Enrichment is important for pigs

The Australian pork industry is committed to continuous improvement of pig welfare and management. The Ridley Enrich SowBlock™ was developed to provide ongoing enrichment, reduce aggression between sows and to give sows the opportunity to express species-specific foraging behaviour.

Environmental enrichment involves modifying an environment to improve the biological functioning of animals (Newberry 1995) and/or allow for the display of strongly motivated species-specific behaviour, such as exploration or foraging. It has been suggested that the behavioural effects of food restriction for gestating sows may be alleviated by providing a substrate (Whittaker et al. 1999), or enrichment, with which to express their foraging behaviour.

Ridley Enrich SowBlock™ is a demonstrated form of Enrichment

In 2013, SunPork Farms started investigating potential sources of enrichment for pigs of all ages with group housed sows as the initial target. Motivation for these investigations originated from a desire to continuously improve animal husbandry practices within the business and identify a foundation for a demonstrable form of enrichment.

Blocks were identified as a potential source of pig enrichment for the following reasons:

1. They can be made to be durable;
2. Pigs tend to forage down rather than up, hence they can be effectively located on the floor for extended periods of time.
3. The ingredient and nutrient composition of the block can be varied depending on the mode of use.
4. As well as providing enrichment, the blocks may be able to supplement parts of the existing diet.
5. Blocks can be used without altering housing, do not require maintenance and they will not interfere with effluent systems.

Having identified the potential for blocks, SunPork Farms initiated a research program to assess their efficacy and have published the results.

Muller et al. (2015) found that the provision of the Ridley Enrich SowBlock™ had a desirable effect on aggressive chase behaviour seen at the time of floor feeding.

In addition, sows receiving the Ridley Enrich SowBlock and 2.3 kg/day of feed and sows receiving a high feeding level of 4.0 kg/day significantly increased lying behaviour and reduced the amount of time spent foraging immediately after feeding compared to control sows receiving 2.3 kg/day of feed ([Table 1](#)). This suggests that the provision of the Ridley Enrich SowBlock™ may induce satiety.

In a separate study with different feeding and housing systems Muller et al. (2016) found that the display of aggression of newly mixed sows associated with group feeding in shoulder stalls was constant across all treatment groups and concluded that housing and feeding systems may also influence aggressive behaviour. However, in this study the prevalence of fresh scratch injuries, which are indicative of recent aggressive attacks, significantly decreased on Day 3 of mixing unfamiliar sows into group pens housed with either one or two Ridley Enrich SowBlock(s)[™] (*Table 2*).

Changes in daily weight of the Ridley Enrich SowBlocks[™] increased after Day 3 of mixing, suggesting an initial period of restricted block disappearance influenced by block hardness or the novelty of it causing some caution of exploration by the sows. The end result is increased interest around Day 8 and 11 after mixing, with complete block disappearance by Day 19 (*Figure 1*).

These results have provided the base for applying Ridley Enrich SowBlock[™] as a demonstrated form of enrichment in a commercial sow housing system when unfamiliar sows are newly mixed and the need to reduce aggression is of great importance.

There is an international patent pending on the use of blocks as a source of enrichment for sows. Pork CRC Ltd, Ridley, SunPork Farms and other collaborators are also conducting further research into the use of enrichment blocks in other stages of pig production.

Table 1 - Mean time (min) sows' spent engaged in behaviour and posture 1 hour after feeding over the four days of observation, for sows in the control group and receiving 2.3 kg/day, sows receiving a high-feeding level (4.0 kg/day) or sows receiving a Ridley Enrich SowBlock[™] in addition to 2.3 kg feed/day. (Pork CRC funded Commercialization Project)

Activity	Treatment			SED	P value
	Control	Block	High feed		
Push	0.09	0.08	0.10	0.24	0.87
Chase	0.29^a	0.08^b	0.11^b	0.47	0.02
Attack	0.40	0.42	0.36	0.58	0.81
Bite	0.10	0.12	0.06	0.25	0.39
Threat	0.13	0.11	0.10	0.27	0.74
Fight time (s)	13.90	15.60	16.40	5.54	0.90
Sham-chewing	0.62	0.51	0.39	0.82	0.26
Foraging	28.48^x	25.67^{xy}	25.15^y	9.76	0.08
Agonistic behaviour	1.01	0.81	0.73	0.94	0.19
Posture					
Lying	9.13^b	13.30^a	13.66^a	11.30	0.038
Sitting	0.24	0.79	0.88	1.67	0.114
Standing	50.63^a	45.91^b	45.26^b	10.85	0.006

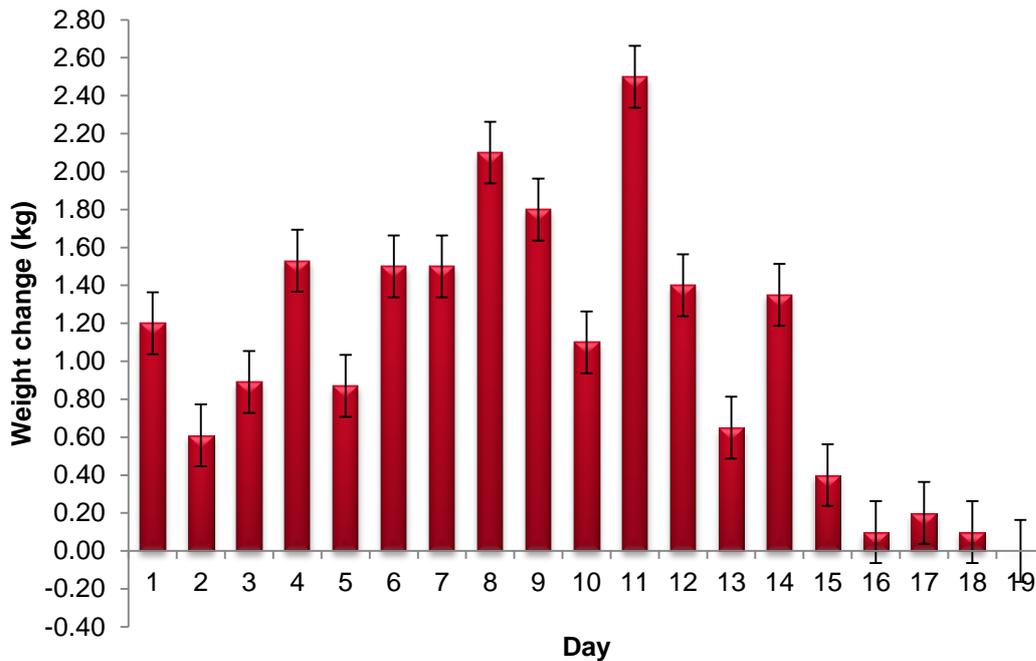
^{ab}Means in a row with different superscripts differ significantly ($P < 0.05$); ^{xy}Means in a row with different superscripts differ significantly ($P < 0.10$); Control, offered 2.3 kg/d; Block, offered 2.3 kg/d and a 30 kg block; High feed, offered 4 kg/d; SED, standard error of difference of the means; Fight time, mean length of fighting bout; Agonistic behaviour, is the combined time spent in push, chase, attack, bite and threat behaviours.

Table 2. Mean number of fresh scratch injuries scored on Day 1, (day after mixing) and Day 3 (3 d post mixing) of sows in the control group and receiving 2.5 kg/day, sows receiving a Ridley Enrich SowBlock™ in addition to 2.5 kg feed/day or sows receiving Two Ridley Enrich SowBlocks™ in addition to 2.5 kg feed/day. (Pork CRC funded Commercialization Project)

	Treatment			SED	P value
	Control	One block	Two Blocks		
Day 1	8.34	8.70	8.28	0.78	0.85
Day 3	1.70^b	1.10^a	0.96^a	0.30	0.04

^{ab}Means in a row with different superscripts differ significantly (P<0.05); SED, standard error of difference of the means.

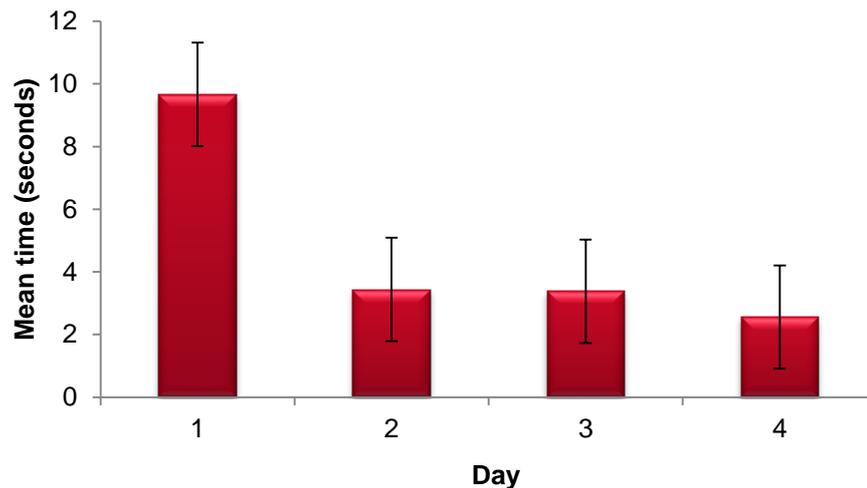
Figure 1. Mean daily change (kg) in block weight measured from Day 1 of mixing unfamiliar sows into a group pen of 15 sows with 1 x 20 kg Ridley Enrich SowBlock™. (Pork CRC funded Commercialization Project)



Primary application of Ridley Enrich SowBlock™ in commercial production systems

Research to date has focussed on the use of Ridley Enrich SowBlocks™ as a means of reducing aggression between unfamiliar sows at the time of mixing into static groups. As aggression is highest during the first four days post-mixing (Figure 2) the Ridley Enrich SowBlock™ can be utilised in place of the provision of additional feed.

Figure 2. Mean time (secs) individual sows spent engaged in a fight 60 minutes after feeding; measured over 4 days, from the day of mixing (Pork CRC funded Project 1C-115)



To utilise the Ridley Enrich SowBlock™ at the time of mixing sows into static groups, the following is recommended or should be noted:

1. Application Rate (blocks) Per Sow:

1 x 20 kg Ridley Enrich SowBlock™ for a group size of up to 15 sows is recommended to reduce ongoing feeding aggression and for environmental enrichment. The block is offered as part of a “free-choice” feeding system.

2. Durability of the Ridley Enrich SowBlock™

1 x 20 kg Ridley Enrich SowBlock™ in a group size of 15 sows may last up to 17 days in gestational group housing. The expected disappearance rate ranges between 70 – 80 g/sow/day (Figure 3).

3. Loose vs Securing fixing the Ridley Enrich SowBlock™

Blocks may need to be fixed or could be used loose depending on the situation. Producers will need to establish what works best in their system.

An advantage of a loose block is that it provides the opportunity for the stock person during daily inspections to move the block into a desirable area. A moveable block may also promote extended sow interest and hence enrichment.

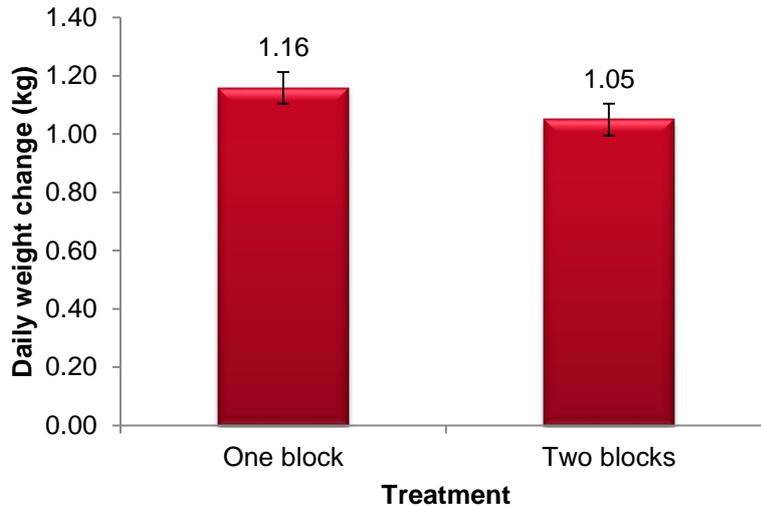
In some situations, however, it is advisable to fix the Ridley Enrich SowBlock™, particularly if the block can be exposed to excess water for extended periods. These situations include when:

- a) Pens have trough(s) as a water source for sows.
- b) The block is persistently moved by sows into the vicinity of nipple drinkers.
- c) There is frequent movement of the block to areas which reduce opportunity for use (eg. head or shoulder stalls or pen corners).

4. Securing the Ridley Enrich SowBlock™

The Ridley Enrich SowBlock™ is very hard. This provides an opportunity to cut or drill holes through the blocks so that they can be secured to a static point or attached to a chain or similar.

Figure 3. Mean daily change (kg) in block weight measured from day 1 - 19 of mixing unfamiliar sows into a group pen of 15 sows with either 1 or 2 x 20 kg Ridley Enrich Sow Block(s)[™]. (Pork CRC funded Commercialization Project)



Alternative applications of the Ridley Enrich SowBlock[™] in commercial production systems

In addition to the demonstrated application of the Ridley Enrich SowBlock[™] at the time of mixing sows into static groups, a range of potential alternatives exist that producers may wish to try. These include:

- To reduce aggression around electronic sow feeders: Strategic placement of Ridley Enrich SowBlocks[™] close to, but away from, the entrance to electronic sow feeding systems may reduce aggression between sows, particularly at the beginning of a feeding cycle.
- To limit repeat visits to electronic sow feeders: In large dynamic groups, application of Ridley Enrich SowBlocks[™] as a form of enrichment and to promote satiety may limit the number of repeat visits of dominant sows to sow feeders after their daily allocation has been consumed.
- General enrichment in large, dynamic groups: The Ridley Enrich SowBlock[™] could be utilised as a source of general enrichment for sows in large dynamic groups.

Considerations for the Nutritionist and Producer

From a nutritional perspective, the following should be noted:

1. While a source of enrichment for groups of sows, not all sows in the group will utilise the Ridley Enrich SowBlock[™]. As a consequence, the blocks cannot be considered as a supplementary source of nutrients.
2. For those sows that do utilise the Ridley Enrich SowBlock[™], anecdotal evidence indicates that while they chew the block, intake may be limited. As not all sows utilise the blocks, this is actually advantageous as it will not increase variation in nutrient intake between sows.
3. The Ridley Enrich SowBlock[™] has been formulated to be:
 - (a) attractive to sows,
 - (b) durable, and
 - (c) if consumed to induce satiety

It is not a balanced source of nutrients and needs to be offered with access to a balanced diet.

4. In all experiments investigating application of the Ridley Enrich Sow Block™, the feeding level and nutrient composition of the gestating sow diet has not been adjusted.
5. The cost of using the Ridley Enrich SowBlock™ is estimated at \$0.20/sow/day based on disappearance rates and durability. By comparison, offering newly mixed sows 4.0 kg gestation diet/sow/day at the time of mixing would cost approximately \$0.48/sow/day in extra feed costs (Assumptions: Cost of Ridley Enrich SowBlock™ (\$2.50/kg); Cost of Sow gestation diet (\$0.30/kg); Extra feed consumed (1.6kg/sow/day); Block consumption (0.08kg/sow/day)).
6. The packaging of the Ridley Enrich SowBlock™ can be safely consumed by sows so the product does not need to be removed from the packaging prior to application.

Composition and analysis of the Ridley Enrich SowBlock™

The exact composition of the Ridley Enrich SowBlock™ is protected information.

Ingredients include: Molasses and other co-products from sugar refining; Vegetable oil; Salt; Organic and inorganic minerals; Setting agents. All ingredients are approved for use in pig diets in Australia and overseas.

Typical nutrient analysis of the Ridley Enrich SowBlock™ is presented in [Table 3](#).

Table 3. Typical Nutrient Analysis of Ridley Enrich SowBlock™ As-fed (%) and Dry-matter Basis (%)

Nutrient analysis	As-fed	Dry matter
Crude Protein %	3.00	3.90
Crude Fat %	2.00	2.60
Crude Fibre %	2.50	3.30
DE_Pig MJ/kg	8.00	10.50
Calcium %	0.50	0.70
Phosphorus %	0.05	0.10
Magnesium %	5.00	6.60
Sodium %	1.50	2.00
Potassium %	1.50	2.00
Sulphur %	1.00	1.30
Chloride %	3.50	4.60
Copper added	nil	nil
Selenium added	nil	nil

Precautions

Excessive contact with water may cause the Ridley Enrich SowBlock™ to break down at a faster rate than desirable for use and/or cause excessive consumption by sows.

Safety Directions / First Aid

See Material Safety Data Sheet (MSDS) – Ridley Enrich SowBlock™

Storage Instructions

For optimum quality and shelf life, product to be stored below 30°C and off the floor in a dry, cool, well ventilated area protected from sunlight.

Shelf Life

Expiry date 2 years from date of manufacture (DOM).

Restrictions

- Withholding period: Nil
- Trade advice: Export slaughter interval (ESI): Not required.
- This product does not contain restricted animal material.
- This product does not contain genetically modified organisms (GMO).

Ridley Contact

Please contact your local Ridley representative for more information or to place an order.

References

- Muller, T., Callaghan, M., Hewitt, R. and van Barneveld, R. (2015) "Use of a nutritional lick block or higher feeding levels to reduce aggression and provide enrichment for sows in groups". *Animal Production Science*. 55: 1497.
- Muller, T., Hewitt, R. and van Barneveld, R. (2016) "The use of a poured supplemental block to reduce feeding associated aggression and provide enrichment for sows during gestation". Report prepared for the Co-operative Research Centre for High Integrity Australian Pork.
- Newberry, R. (1995) Environmental enrichment: increasing the biological relevance of captive environments. *Applied Animal Behavioural Science*. 44: 229-243.
- Whittaker, X., Edwards, S., Spolder, H., Lawrence, A. and Corning, S. (1999) Effects of straw bedding and high fibre diets on the behaviour of floor fed group-housed sows. *Applied Animal Behaviour Science*. 63: 25-39.

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