

# **ON-FARM EXPERIENCE WITH SWINE LIQUID FEEDING: GROW-FINISH PIGS**

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## **ABSTRACT**

At the Van Ryswyck farm a single-line, single mixing tank liquid feeding system and auto-sorter were installed in 2001. After some initial challenges with ad-libitum feeding we have fine-tuned our feeding program and how we use our liquid feeding system. Since implementing these changes we are achieving good growth performance and carcass quality. Both technologies have helped to reduce feed costs and labour in our operation.

## **INTRODUCTION: BRIEF DESCRIPTION OF THE SYSTEM**

Our operation consists of a 1400 head wean to finish facility located in Oxford County. The early wean facility is run on an all in all out basis using complete feeds. The finishing facility consists of two rooms which are run on an all in-all out basis by room. The finishing facility was renovated in 2001 to go to total slatted flooring and utilize liquid feeding and auto sorting technologies. Each room holds 450-500 finishing pigs with dimensions of 12.2 m x 27.4 m per room to provide 0.74 to 0.67 m<sup>2</sup>/pig (Diagram 1).

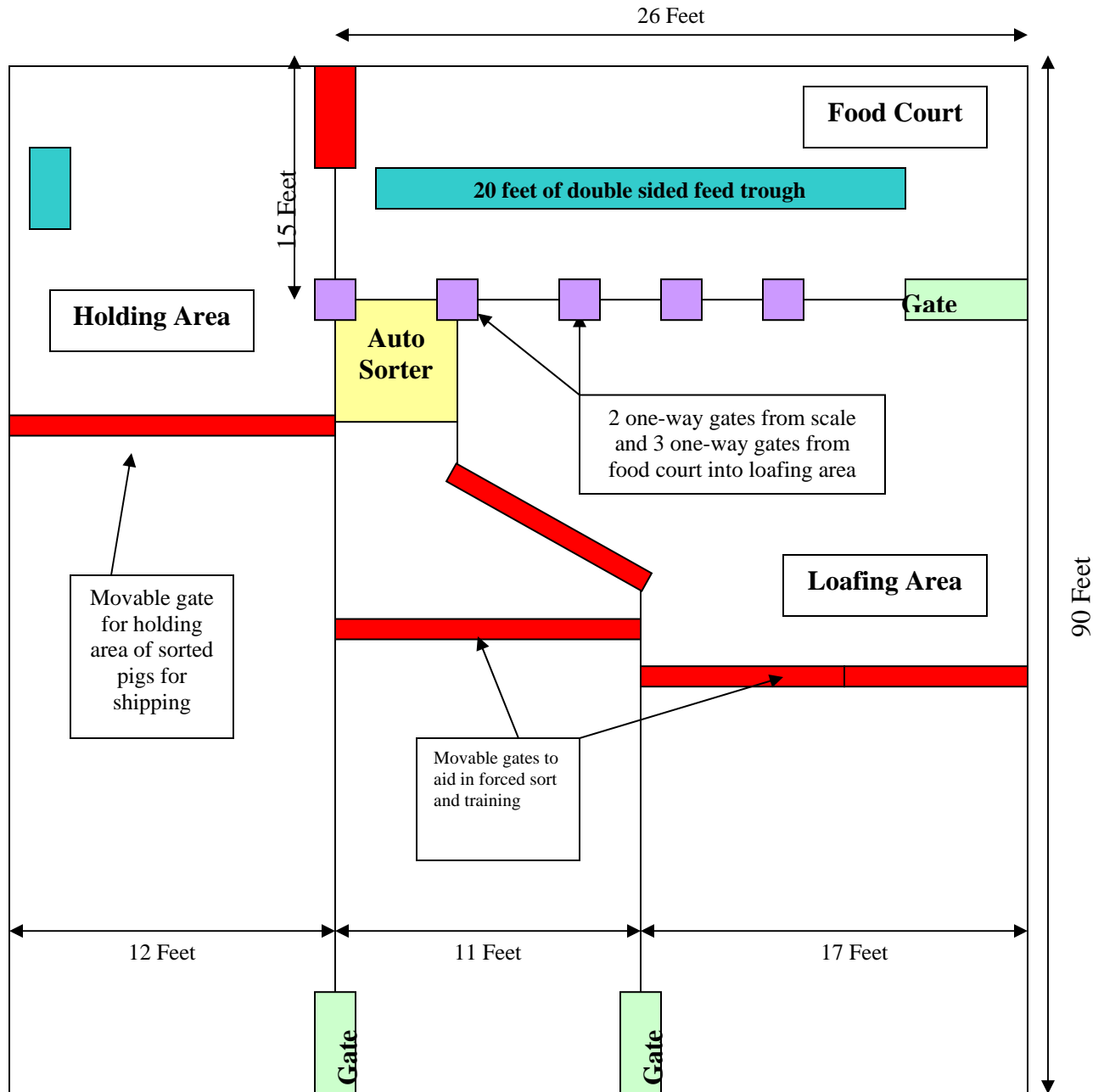
The liquid feeding system utilizes on farm grown high moisture corn, concentrate and a condensed whey containing 37% dry matter. It is a single line, single mixing tank Hampshire system. The pump and agitation are contained in a single unit. During circulation feed pushes feed and there is feed in the line at all times. The feed in the line never sits for more than one hour without being re-circulated and brought back to the tank for agitation. The feeding system checks the probes in the troughs a minimum of once per hour.

The liquid system is what I call a semi ad-lib system. The difference between this and a fully ad-lib system is that each room is fed a different ration depending on the pigs' weight. Therefore a room is fed its ration based on weight for 2 hours while the other room is in a rest period. I personally prefer this method because it matches the correct ration with the desired weight range and allows for less feed wastage than a traditional ad-lib system by restricting feed delivery during the rest period.

There are nine pigs allocated per feeder space, which in my opinion is the bare minimum for optimum growth. Current recommendations are for 1.5 inches of trough per pig making my trough about 8 feet short. The auto sorter was originally used as the only entrance to the feed court but soon after installation of the system I believed that pig flow to the feed court was compromised by time. Therefore we added one gate, which I leave open all of the time to the feeding court as well as opening a moveable gate at the back of the food court to allow easier

access to feed. The only time these gates are closed is during a forced sort or during a training period.

**Diagram 1. Layout of room design.**



Training of the pigs starts at about 68 kg and is a must for a smooth transition to a forced sort. Every one to two weeks the pigs are moved compartment-by-compartment closer to the scale until they have all been weighed. I believe you must also do this once or twice during the shipping period to ensure that all pigs in the room have been weighed before shipping day. The actual training period begins with the pigs being confined by room towards where the scale will eventually be positioned. There is a corridor in the centre of the loafing area with partitions towards a funnel system. After the pigs move through where the scale will eventually be positioned, they must pass through one-way gates into the feed court. After about two training periods during which the pigs pass through without a scale the auto sort is first introduced with all doors locked open so that the pigs can pass through easily. After about 2 weeks of passing through with the doors locked open the full automation of the system is introduced and then every one to two weeks the pigs are force trained in full automation mode.

## **PRACTICAL EXPERIENCES, ADVANTAGES AND DISADVANTAGES**

Before going to condensed whey permeate (CWP), high moisture corn (HMC) was purchased in at the end of the summer. During the filling process the blower smashed the corn so much it could not be handled in the system. Since then we have changed our handling system to make this process easier. Because we could not grow enough corn and did not want to continue to purchase HMC we added CWP to the feeding program. The addition of CWP to the program did not go as smoothly as we would have liked. Carcass backfat was initially higher than we wanted to maximize our returns at Conestoga. We worked with our feed supplier over a couple of turns to fine-tune the rations and how we feed them (Figure 1).

Some of the changes we made included:

- Better understanding of the nutritional value of the CWP. As a result we also lowered the energy level of our custom concentrate significantly.
- Reducing the amount of CWP in the diet (more due to short supply and product variation when it started coming from many different plants).
- Increased the water to feed ratio as the pigs get bigger. This dilutes the nutrient density of the diet in the finishing stage. Also we felt that this was a benefit in the summer as the liquid feed is really the main source of water for the pigs.
- Went to three phase feeding to more closely match the nutritional requirements to the weight of pig.
- Implemented the semi ad-libitum feeding versus as-libitum feeding.

Since we made these changes the carcass quality improved to our target level without sacrificing any growth or days to market (Figures 2 and 3).

**Figure 1. Van Ryswyck liquid feeding program.**

Final body weight, kg	115		
Initial body weight for each ration, kg	25	50	75
Dry matter liquid, %	20.5	19.5	18.5
Dry matter standardized, %	88.0	88.0	88.0
Dry matter of air dry, %	88.7	88.9	89.4
Ratio water to standardized dry feed	3.29	3.51	3.76
Ratio water to absolute dry matter	3.88	4.13	4.41

	Ration 1	Ration 2	Ration 3	air dry DM	DM as fed
<b>Composition (%) air dry basis</b>					
Corn	69.8	70.7	69.0	88.0	71.0
Whey Permeat McNess	5.0	7.5	12.5	97.5	41.2
VanRyswyck Whey Supp2	25.2	21.8	18.5	89.0	89.0
Total	100.0	100.0	100.0		

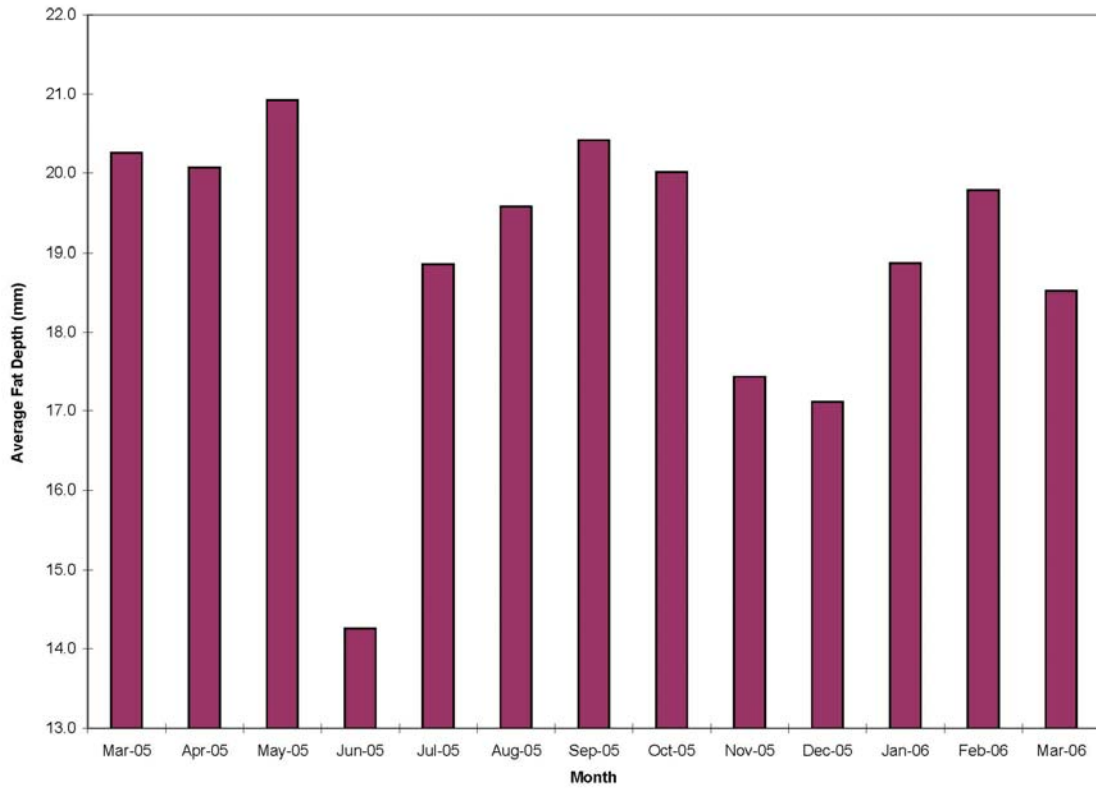
**On basis of standardized DM:**

Actual energy kcal DE / kg	3162	3174	3187
Actual energy kcal DE / kg of liquid feed	737	703	670
Actual total lysine, %	0.96	0.86	0.77
Crude Protein, %	15.6	14.4	13.1
Calcium, %	0.62	0.56	0.51
Phosphorus, %	0.53	0.50	0.49
Available Phosphorus, %	0.23	0.22	0.22
Ca / P	1.18	1.11	1.04
Sodium, %	0.17	0.17	0.18
Copper, ppm	125	108	91

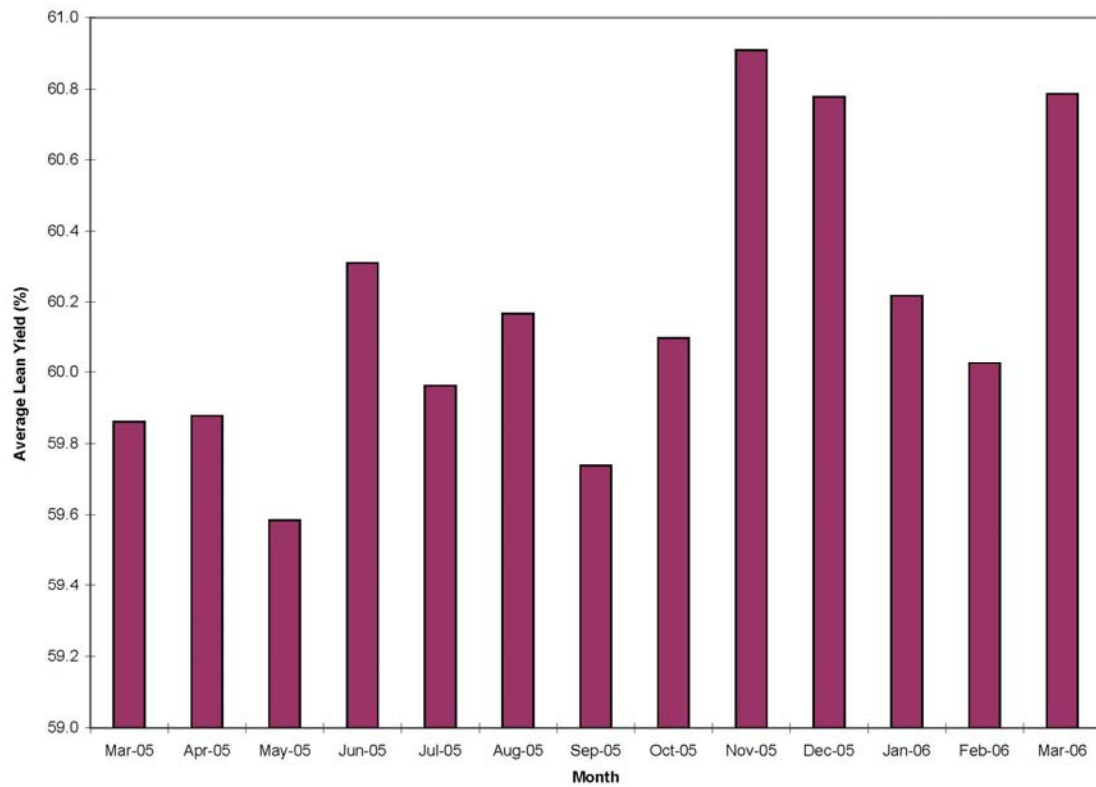
<b>Composition (%) on basis of absolute dry matter</b>	%	%	%
Corn	69.2	69.9	68.0
Whey Permeat McNess	5.5	8.2	13.6
VanRyswyck Whey Supp2	25.3	21.9	18.4
Total	100.0	100.0	100.0

<b>Composition (kg) on basis of liquid dry matter</b>	Quantity As fed	Quantity As fed	Quantity As fed
Corn	299.7	288.1	265.7
Whey Permeat McNess	41.0	58.4	91.8
VanRyswyck Whey Supp2	87.4	71.8	57.3
Water	1071.9	1081.7	1085.1
Total	1500.0	1500.0	1500.0

**Figure 2. Average fat depth (mm) by month.**



**Figure 3. Average lean yield (%) by month.**



The liquid feeding system does have its advantages and disadvantages:

- The system is very power hungry because it runs so often. However, the feed remains in suspension and “fresh” at all times.
- The equipment is very temperamental to fluctuations in hydro. For example, hydro spikes have caused damage to inverters totaling \$10,000. These issues were corrected when Ontario Hydro installed taps on the transformers to limit the over supply of voltage. All panels have had surge protection installed and since the changes were made we have had no problems.
- Acidity of the CWP eats away at the infrastructure around the food court. This damage is isolated to this one area of the barn and is probably not much worse than traditional wet-dry feeders. The acidity might also be causing some slightly higher mortality due to ulcers (~1%).
- Alarms really ruin the mood.
- Labour is greatly reduced.
- The ability to use co-products and save some feed cost. Initially we were saving up to \$5/pig and this has probably declined as we reduced the amount of whey in the rations.
- Pigs love the liquid feed and they eat, eat, eat.
- Initial system not that expensive. The downside is maintenance is fairly expensive because all of the parts are from the European Union.
- Performance continues to be excellent with days to market hovering around 88.

Some of the changes which I have implemented since first starting the auto sorting include:

- Removed the scale head from the crate and positioned it in a stationary position above the crate to protect it from movement during weighing.
- Added extra gates to aid in the smoother movement of pigs closer to the scale for training and forced sorting by myself. We had an earlier problem where two small pigs could get on the scale at the same time and trigger a mistaken correct weight for shipping. Removing these smaller pigs from the pigs already sorted for shipping was a challenge. The manufacturer of the scale installed an override that consists of a predetermined weight that will automatically open the gate to the loafing area and not to the pre-shipping area if the weight exceeds the predetermined setting.

Overall I am extremely pleased with both the auto sorting and liquid feeding. A couple of things which I would change would be to add more trough area for feeding and give more space allowance leaving the scale into a sometimes congested feed court.