*How to Profit from the OlyWest Contract*

# Consideration of Genetics

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## *Introduction*

As we move through the year 2004, hog producers continue to be faced with a changing and challenging environment. Many of these changes are beyond the control of the producer, and yet the impact on the producer can be very large. The recent introduction of a new payment grid and contract for Alberta producers, the "OlyWest Contract", brings some significant changes. One can ask how an individual producer can make the best of this contract today, and what can be done to get more from it in the future. One can also consider underlying reasons for the changes from the customer's perspective. What is it that Olymel and their customers are truly after? The first question is the primary focus of these seminars. However, for the industry, it is also very important to consider the second question. The industry should be striving to constantly enhance the true value of the product as the years go by, and not abandon this objective with a total focus on today's marketing opportunities. That can be difficult, especially in periods of economic hardship, but consider how different this new contract is from the previous one. Consider how different the previous one was to what was in place 10 years ago. Although the payment incentives have changed drastically, one should ask whether or not there has been substantial change in what the customers are looking for.

When you give consideration to genetics, the question of true value is much more important than the one of today's marketing opportunities. You can't change genetics in your hogs over-night. Understanding what the customer is likely to want next year and 5 years from now are questions to ask when you consider genetics. The genetics you have in today's hogs are a result of decisions taken last year and 5 years ago. As such, in talking about genetics, there are two important considerations: 1. what can you do with the genetics that are currently available to make the most of today's marketing opportunities, specifically the OlyWest Contract? and 2. what should you do regarding genetics for next year and the years to follow?

## *Making the most of today's genetics*

Among other things, the new OlyWest contract considers three key carcass measurements which are strongly influenced by genetics: lean depth, fat depth and lean yield. How these are being used to provide incentives has changed such that:

1. there are deductions of up to $5 per hog and premiums of up to $6 per hog based on lean depth

2. the index for the top two lean yield classes are no longer the highest, and
3. a minimum of 12 mm of fat is required to get loin premiums

Let us start by looking at where producers are now, and some examples of what impact changing the hogs would have.

## Lean depth premiums and deductions

Figure 1 shows how Alberta hogs from 2003 graded for lean depth. For discussion purposes, consider four groups of hogs:

1. hogs with not enough lean and have deductions of $2 to $5 (< 57 mm lean)
2. hogs with not quite enough lean for the best premiums (57 mm to 60.9 mm). These hogs have premiums of up to $3.
3. hogs with the best premiums of $5 or $6 (61 mm to 65.9 mm)
4. hogs with too much lean (58 mm or more) which have premiums of up to $2.

If all the producers made some effort to increase lean depth, hogs would tend to move to the better premiums. However, we would also see an increase in the percentage of hogs that are too lean. We can simulate the effect of this by adding some lean to last year's hogs. Figure 2 is an example, where 2 mm of lean has been added to each hog. This shift turns out to be worth an extra $0.75 per hog in loin premiums, as shown in Table 1.

**Table 1.** Distribution of lean depth in Alberta hogs and effect of adding 2 mm of lean.

| | **WHE 2003 % of hogs** | **After adding 2mm to lean depth % o hogs** | **Change** |
|---|---|---|---|
| 1. not enough lean | 37.7 | 26.6 | -11.1% |
| 2. almost enough | 25.5 | 24.2 | -1.3% |
| 3. just right | 22.6 | 27.5 | +4.9% |
| 4. too much lean | 14.0 | 21.5 | +7.5% |
| Average lean depth | 58.6 | 60.6 | +2 mm |
| Average loin premium | $0.55 | $1.30 | +$0.75/hog |

One could continue to add more lean and increase the average loin premiums, but at some point an optimum will be reached. Figure 3 shows that average loin premium would continue to increase at a diminishing rate until the average was about 64.6 mm. After this, further increases in loin depth would result in lower average premiums.

**Figure 1.** Distribution of grading lean depth in Alberta hogs in 2003 (source Western Hog Exchange, Feb. 2004)

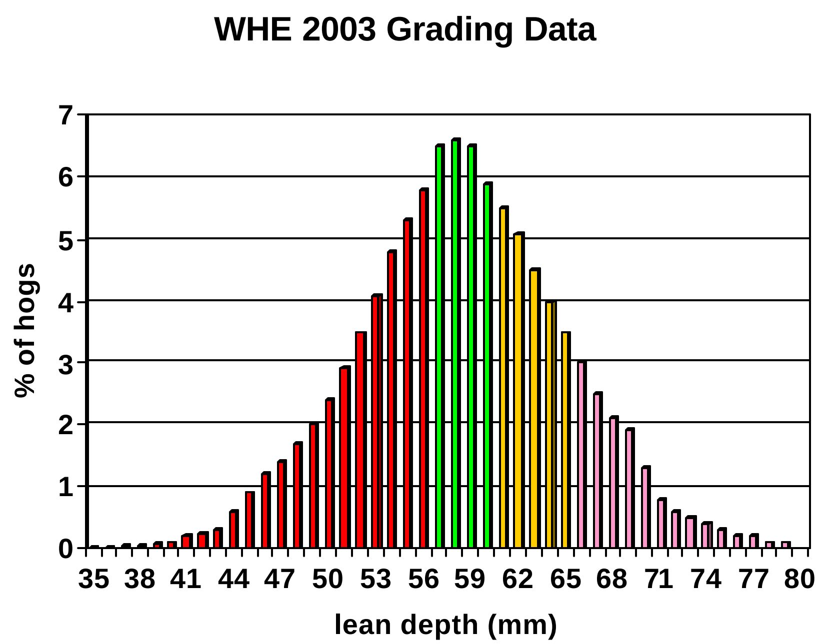



**Figure 2**. Distribution of grading lean depth in Alberta hogs in 2003 after adding 2 mm.

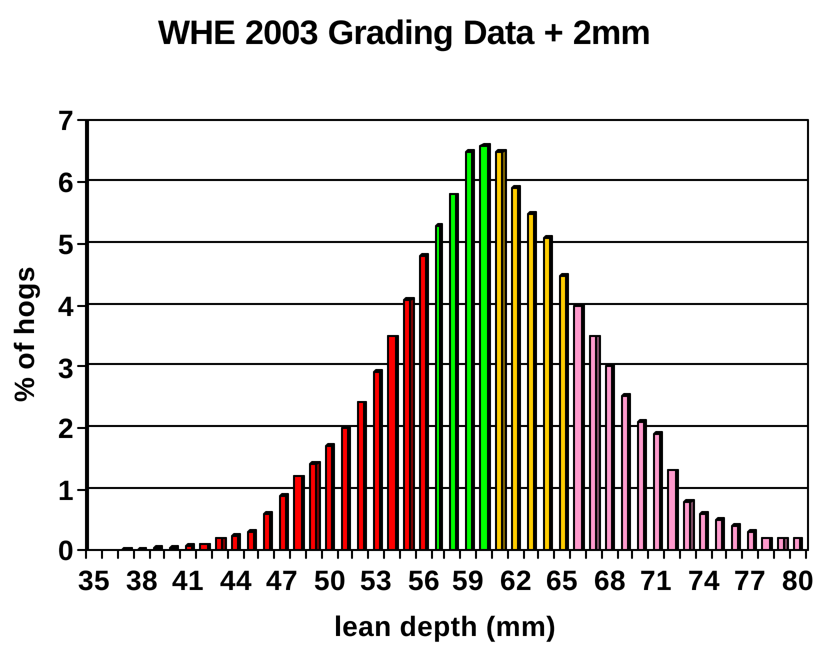
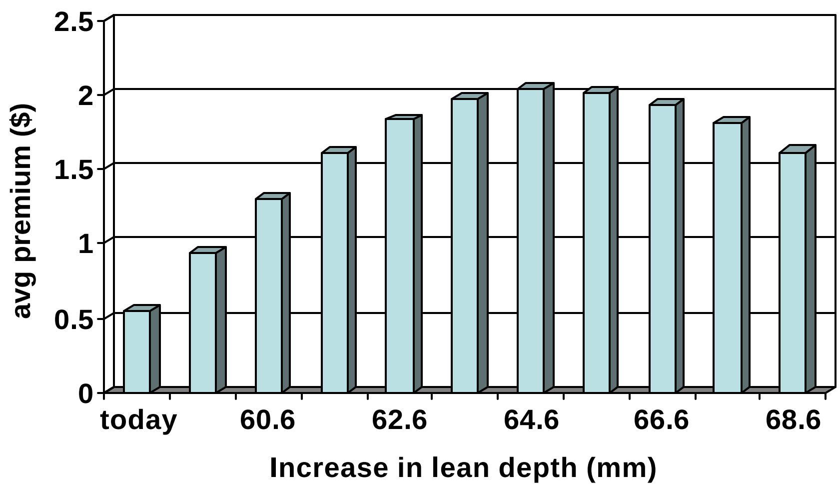


**Figure 3.** Effect of increasing lean depth on average loin premium per hog.




## Lean yield premiums and deductions

Packers in Canada have long since provided incentives to produce leaner and leaner hogs through the use of the grading grid. For hogs that meet a desirable weight, the leaner hogs have received the highest prices. With this new grid, however, there is less reward for the top two lean yield classes (greater than 63% lean yield). As with lean depth, there is a diminishing increase in value as lean yield increases, and eventually an optimum will be reached.

Figure 4 shows the distribution of estimated lean yield in Alberta hogs in 2003. The highest premiums are paid when lean yield is between 60.7 and 62.99% (yield classes 3 and 4). Premiums are somewhat smaller for hogs that are leaner than this. Premiums decrease in a similar pattern for hogs that are not quite this lean, and there is a substantial deduction if lean yield is below 56.9%.

It is clear that increasing lean yield on average would have a positive effect on grading index. However, for the individual producer, how much value there is will depend on the herd's current lean yield average. Figure 5 shows how much extra revenue per hog would result from a 1% increase in herd average lean yield, depending on where the herd currently is. For example, if a herd currently averages 58% lean yield, increasing to 59% would give an extra $5.09 per hog due to higher index. On the other extreme, if the herd was already at 62% on average, increasing to 63% would have almost no effect on index. The 2003 average for Alberta hogs is about 60%, so for a typical producer, increasing lean yield to 61% would be worth an extra $2.25 per hog.

**Figure 4.** Distribution of estimated lean yield in Alberta hogs in 2003 (source Western Hog Exchange, Feb. 2004)

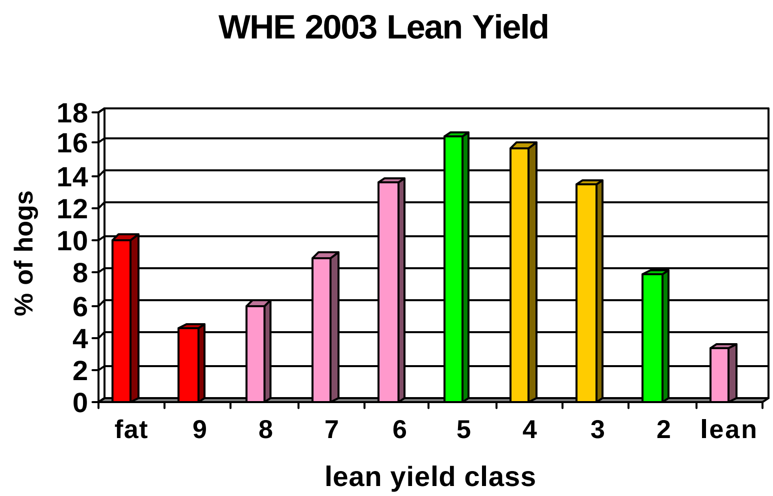
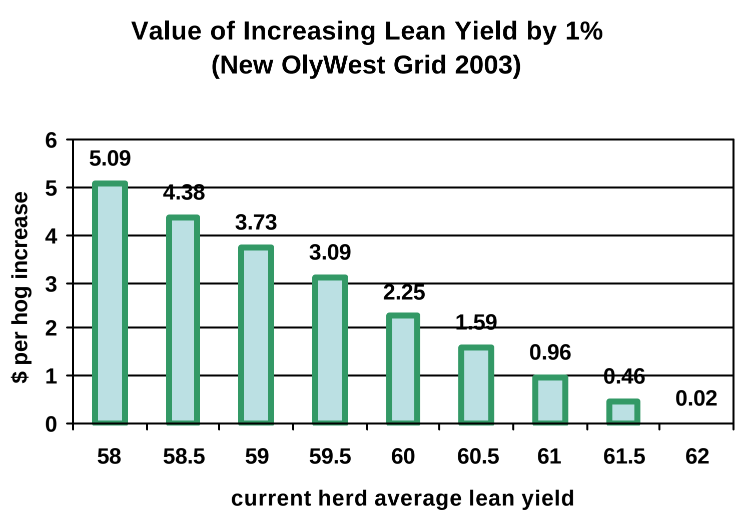



**Figure 5.** Value per hog of increasing lean yield by 1% depending on current herd average lean yield (assuming $1.30/kg).



## Effect of not enough backfat

The OlyWest contract also indicates that no loin depth premiums will be paid on hogs with less than 12 mm of backfat. We saw earlier that there would be substantial benefit from increasing lean yield and lean depth. If producers do this, it will also mean that backfat will be decreasing. A relatively small percentage of Alberta hogs currently have this problem, but for producers with leaner hogs it is more important. Even for these producers though, the hogs with less than 12 mm of fat will tend to be the same hogs with too much lean depth. In other words, many of them would only be getting a small premium or none at all, so too little fat may not be a huge loss. The benefits from optimizing lean yield and lean depth should easily exceed these lost premiums.

## What to do about lean yield?

We have seen in figure 5, for a typical producer, there would be a $2.25 per hog benefit from increasing lean yield from 60% to 61%. Increasing it further to 62% would bring an additional $0.96 per hog. In addition to this direct benefit from higher index, there is an extra bonus. Lean depth will tend to increase by about 1.3 mm per 1% increase in lean yield. This will result in higher average lean depth premiums of about $1.00 per hog if you increase from 60% to 62% lean yield. Thus, there is a total benefit of about $4.25 per hog from a 2% increase in lean yield. Note that the benefit of a 2% increase in lean yield will be greater if the current herd average is below 60%, and lower if the herd average is already higher than 60% (see figure 5).

## What to do about lean depth?

As we saw in table 1, increasing lean depth from 58.6 to 60.6 mm would be worth an extra $0.75 per hog. From figure 6, there would be $1.50 per hog benefit to increase lean depth from 58.6 mm up to 64.6 mm. This would take a lot of effort for relatively small returns compared to simply increasing lean yield. There may be some cases where lean yield is already quite high, but lean depth is very low. In these cases it may be worthwhile to concentrate directly on lean depth. However, for most producers, best returns will likely come from increasing lean yield first.

## Increasing uniformity of lean yield and lean depth

Increasing herd averages for both lean yield and lean depth will make a big difference for most producers. Another important consideration is the uniformity of hogs for these traits. As herd averages get close to optimum, increasing uniformity can have a very large impact. Lean depth will be used to illustrate this, but the same patterns would be seen for lean yield, and indirectly you can also expect fewer extremes for backfat.

Again, consider the same four groups of hogs mentioned earlier: 1. hogs with not enough lean, 2. hogs with not quite enough lean, 3. hogs with the best loin premiums, and 4. hogs with too much lean. Table 2 shows how the percentage of hogs with the best loin premiums changes with both herd average and uniformity. Herds will tend to have standard deviations in the 6.0 mm to 7.0 mm range. In this case you might target an average of 63 to 64 mm, and until you get close to that average, increasing uniformity doesn't help very much. In fact, it even makes it worse if your herd average is very low.

**Table 2.** Percentage of hogs with the "best loin premiums" ($5 or $6 premium) depending on herd average and uniformity (smaller standard deviation is more uniform).

| | Standard deviation of lean depth | | | | |
|---|---|---|---|---|---|
| Average loin depth | 7.0 | 6.5 | 6.0 | 5.5 | 5.0 |
| 56 | 16.1 | 15.9 | 15.5 | 14.7 | 13.6 |
| 57 | 18.5 | 18.6 | 18.6 | 18.3 | 17.6 |
| 58 | 20.8 | 21.3 | 21.7 | 22.0 | 22.0 |
| 59 | 22.9 | 23.8 | 24.8 | 25.7 | 26.4 |
| 60 | 24.8 | 26.1 | 27.5 | 29.0 | 30.6 |
| 61 | 26.3 | 27.9 | 30.0 | 31.8 | 34.1 |
| 62 | 27.3 | 29.2 | 31.4 | 33.9 | 36.7 |
| 63 | 27.8 | 29.9 | 32.2 | 34.9 | 38.1 |
| 64 | 27.8 | 29.9 | 32.2 | 34.9 | 38.1 |
| 65 | 27.3 | 29.2 | 31.4 | 33.9 | 36.7 |

It is also necessary to look at how the distribution of hogs is changing in the other three groups. Tables 3, 4 and 5 provide this information. Finding the exact optimum for your herd gets rather complicated as you can see. However, this information can be used to identify general directions to move an individual herd.

**Table 3.** Percentage of hogs with "not enough lean" ($2 to $5 deduction) depending on herd average and uniformity (smaller standard deviation is more uniform).

| | Standard deviation of lean depth | | | | |
|---|---|---|---|---|---|
| Average loin depth | 7.0 | 6.5 | 6.0 | 5.5 | 5.0 |
| 56 | 55.7 | 56.1 | 56.7 | 57.2 | 57.9 |
| 57 | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| 58 | 44.3 | 43.9 | 43.4 | 42.8 | 42.1 |
| 59 | 38.8 | 37.9 | 36.9 | 35.8 | 34.5 |
| 60 | 33.4 | 32.2 | 30.9 | 29.3 | 27.4 |
| 61 | 28.4 | 26.9 | 25.3 | 23.3 | 21.2 |
| 62 | 23.8 | 22.1 | 20.2 | 18.2 | 15.9 |
| 63 | 20.0 | 17.8 | 15.9 | 13.8 | 11.5 |
| 64 | 15.9 | 14.1 | 12.2 | 10.2 | 8.1 |
| 65 | 12.7 | 10.9 | 9.1 | 7.3 | 5.5 |

**Table 4.** Percentage of hogs with "too much lean" ($0 to $2 premium) depending on herd average and uniformity (smaller standard deviation is more uniform).

| | Standard deviation of lean depth | | | | |
|---|---|---|---|---|---|
| Average loin depth | 7.0 | 6.5 | 6.0 | 5.5 | 5.0 |
| 56 | 7.7 | 6.2 | 4.8 | 3.5 | 2.3 |
| 57 | 9.9 | 8.3 | 6.7 | 5.1 | 3.6 |
| 58 | 12.7 | 10.9 | 9.1 | 7.3 | 5.5 |
| 59 | 15.9 | 14.1 | 12.2 | 10.2 | 8.1 |
| 60 | 20.0 | 17.8 | 15.9 | 13.8 | 11.5 |
| 61 | 23.8 | 22.1 | 20.2 | 18.2 | 15.9 |
| 62 | 28.4 | 26.9 | 25.3 | 23.4 | 21.2 |
| 63 | 33.4 | 32.2 | 30.9 | 29.3 | 27.4 |
| 64 | 38.8 | 37.9 | 36.9 | 35.8 | 34.5 |
| 65 | 44.3 | 43.9 | 43.4 | 42.8 | 42.1 |

**Table 5.** Percentage of hogs with "not quite enough lean" ($0 to $3 premium) depending on herd average and uniformity (smaller standard deviation is more uniform).

| | Standard deviation of lean depth | | | | |
|---|---|---|---|---|---|
| Average loin depth | 7.0 | 6.5 | 6.0 | 5.5 | 5.0 |
| 56 | 20.6 | 21.8 | 23.2 | 24.6 | 26.2 |
| 57 | 21.6 | 23.1 | 24.8 | 26.7 | 28.8 |
| 58 | 22.3 | 23.9 | 25.8 | 27.9 | 30.1 |
| 59 | 22.5 | 24.2 | 26.1 | 28.4 | 31.1 |
| 60 | 22.3 | 23.9 | 25.8 | 27.9 | 30.1 |
| 61 | 21.6 | 23.1 | 24.8 | 26.7 | 28.8 |
| 62 | 20.6 | 21.8 | 23.2 | 24.6 | 26.2 |
| 63 | 19.2 | 20.1 | 21.1 | 22.0 | 23.0 |
| 64 | 17.6 | 18.1 | 18.7 | 19.1 | 19.4 |
| 65 | 15.7 | 16.0 | 16.1 | 16.1 | 15.7 |

## Example of what you can change – carcass weight

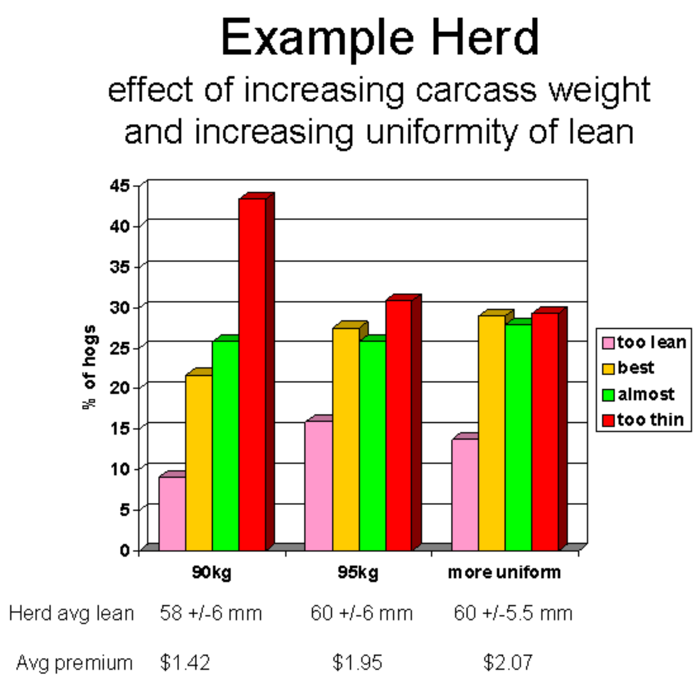
One thing the producers have control over is carcass weight. Both average weight and uniformity of weights can be changed. More uniform weights would result in more uniform lean depths. Increasing average carcass weight is also worth considering, since typically lean will increase by about 0.3 mm per 1 kg increase in carcass weight. At the same time, fat will tend to increase only slightly (typically about 0.1 mm per kg), with the result that estimated lean yield remains the same. There are exceptions of course, but this is a general tendency for today's genetically lean hogs. Were you wondering if I might ever talk about genetics?

### Example of increasing carcass weight and uniformity of lean depth

An example herd in Alberta is currently averaging just over 58 mm of lean depth with an average carcass weight of 90 kg. The herd already has reasonably uniform lean depths, with a standard deviation of 6 mm. However, it is believed that with a little more effort, such as controlling shipping weights, this could be made more uniform and the standard deviation could be reduced to 5.5 mm. It is also clear that more lean depth will result in better loin premiums. The producer therefore decides to try shipping to get an average carcass weight of 95 kg, taking care not to go over 100 kg.

The first set of bars in figure 6 show the current distribution of hogs in each of the four loin premium groups discussed above. Currently more than 40% of hogs have too little lean (labelled "too thin"). Suppose increasing carcass weight by 5 kg and some minor nutritional changes results in an extra 2 mm of lean. This reduces the proportion of "too thin" hogs down to 30%. There are corresponding increases in the "best" and "too lean" groups, and the net effect of this change is an extra $0.53 per hog in average loin premium. If the hogs can be made more uniform in addition to increasing the average, average loin premiums would increase by another $0.12 per hog.

**Figure 6.** Example of changes in distribution of hogs for loin premiums with increasing lean depth and increasing uniformity.




Although you can't expect these exact results, the example helps to focus efforts where the most returns can be realized. In this case, because the herd is already quite uniform and the lean depth is a bit low, efforts to increase lean depth will return more than increasing uniformity. There is benefit to do both, and one can decide if either or both are worth the effort to make some changes.

### What other changes can be made?

There are many other management factors that can influence lean depth, lean yield, back fat and uniformity. Weighing and sorting is one of the most influential, but you might also consider such things as split sex rearing and marketing, disease management, nutrition, and of course, genetics. So, finally, I'll cover a little about genetics.

## *Genetics for next year and the years to follow*

Until now, the word genetics has scarcely been mentioned. This is not because of a lack of importance for the producer. On the contrary, as you will see, the genetics a producer has available and how they are used can make a huge difference. However, genetics isn't something that can be changed over-night. Changing terminal sire choices is relatively quick and easy, but even then it will be 9 months before the full effect of this change can take place. Changing genetics in the sow takes longer, and can take several years in some situations. Thus, when you look at today's genetics, it is the decisions that were made over the past several years that got you here. It's not really all that complicated, but the decisions today will have a large impact on where you will be five years from now.

To get the most from genetics, producers should be certain to:

1. use a "good" genetic source,
2. minimize genetic lag, and
3. take advantage of cross-breeding

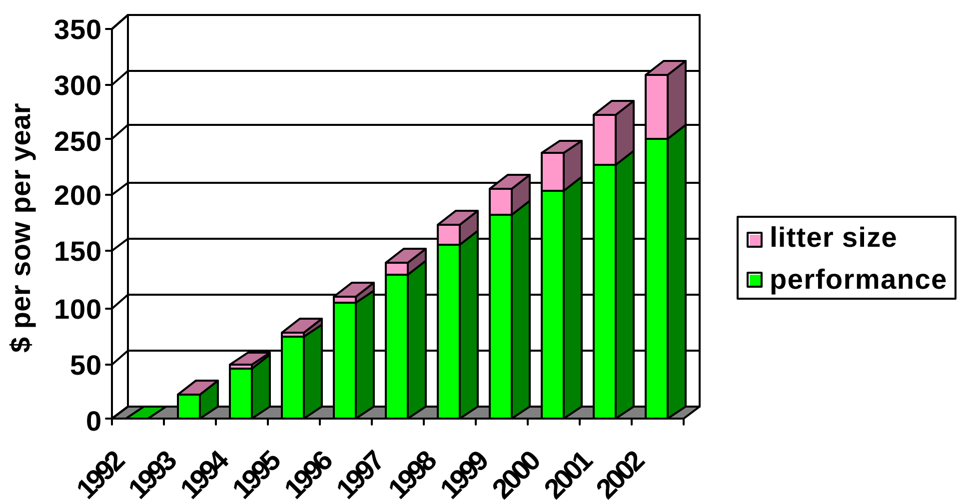
### A "good" genetic source

A good genetic source is not something that is simply discovered. A good genetic source is developed using sound science-based tools that have been applied with diligence for many many years. One of the most important things to consider is whether or not there is evidence of long-term genetic improvement, and just as important, is the current genetic improvement program credible and providing evidence of continued rapid improvement. A decent program should be making your commercial operation more efficient by at least $1.50 per hog every year. Because genetic change is permanent, each year adds on top of previous improvements. In 10 years, that adds up to $15 per hog. You can see the importance of a long history of improvement.

An example is the Canadian Swine Improvement Program (CSIP). Breeders in Canada have used this program for effective selection since the 1970s, and even before that. Today's state of the art methodology for genetic evaluation (BLUP) was introduced in Canada in the mid-1980s, and was the first such national evaluation in the world. The program has several geneticists and computer specialists supporting and developing it nationally, but is also supported through cooperative efforts with researchers from across Canada. There are about 9000 purebred nucleus sows (primarily Yorkshire, Landrace and Duroc) on the program and 90,000 pigs are tested each year to identify better and better replacements at the nucleus level.

There are other good programs available, but to be good, they need to have a similar basis. That is to say, a credible science-based program, strong technical support, continual R&D and at least three large distinct nucleus breeds. A good program can also demonstrate results. Figure 7 shows how important genetic improvement has been to producers using these genetic sources. Without this improvement in the last 10 years, the bottom line for producers would be $300 per sow worse than it is today. More productivity today is due to genetic improvements for growth, efficiency, lean yield, and litter size. A producer that is not tapping into this type of improvement is at a big disadvantage.

**Figure 7.** Value of genetic improvement in litter size and hog performance




## Minimizing genetic lag

Just as important as having access to a good genetic source is making sure that continual improvement flows into the commercial herd as fast as possible. For example, all the genetic improvement made in sow lines for litter size in the last 10 years is not doing a producer any good if the new genetics haven't been brought into the herd for 10 years. Even to be 5 years behind is a huge cost to the producer. A 5 year lag means the producer is losing out on:

0.7% lean yield, worth about $1 per hog on the OlyWest contract
0.7 mm of lean depth, worth about $0.30 per hog on the OlyWest contract
1 week to market, worth about $2 or more per hog in overhead
9 kg of feed per hog, worth about $2 or more
1.1 pigs born per litter, worth about $3 or more per hog

Adding these all up, there is more than $8 per hog to be had (or lost). One very important point to note is that more than 80% of the benefit to the producer is coming from improved efficiency of production. The extra $1.30 per hog from the packer is certainly important, but saving $7 per hog or more from efficiency is even more important.

## Take advantage of cross-breeding

Producers need to take advantage of the benefits from cross-breeding. Cross-bred sows and hogs out-perform their parent lines at all stages of production. It is particularly important in the productivity of the sow and early performance of the piglets. When you add it all up, you could be looking at 30% to 40% more kg of weaned pigs per sow from using cross-breds compared to their purebred parent lines.

Table 6 shows the average boost from using cross-breds compared to parent lines in research trials from around the world. The top part of the table is for the commercial sow, such as a Yorkshire X Landrace F1. The bottom half is for the commercial litter of hogs and is what to expect from a sire line breed which is completely different than any of the breeds used in the commercial sow. An example is the Duroc when bred to a Yorkshire X Landrace F1. The benefits are additive, so you can add the top and bottom together to get the total potential benefits from cross-breeding.

**Table 6.** The effect of hybrid vigor on performance of sows (dam heterosis) and hogs (litter heterosis).

| Trait | Heterosis level |
|---|---|
| **Dam heterosis** (crossbred sow) | |
| Conception rate | +3% |
| Litter size at birth | +0.66 pig |
| Litter size at weaning | +0.84 pig |
| Litter weight at 42 days | +15.0 kg |
| | |
| **Litter heterosis** (crossbred piglet) | |
| Litter size at birth | +0.24 pig |
| Litter size at weaning | +0.49 pig |
| Litter weight at 42 days | +13.35 kg |
| Post-weaning growth | 7.5% |

Source: Genetics of the Pig, 1998

## An example of getting the most from genetics

Figure 8 shows what a producer can expect who is using F1s and terminal Durocs from a good genetic source (a CSIP breeder in this example). The producer is turning the herd over regularly by bringing in 40% replacements each year. In this example, the producer is spending $28,000 per year in genetic replacements and the benefits increase steadily each year from $76,000 in year 1 to $141,000 in year 5.

**Figure 8.** Benefiting from a good genetic source, minimizing genetic lag, and taking advantage of cross-breeding.

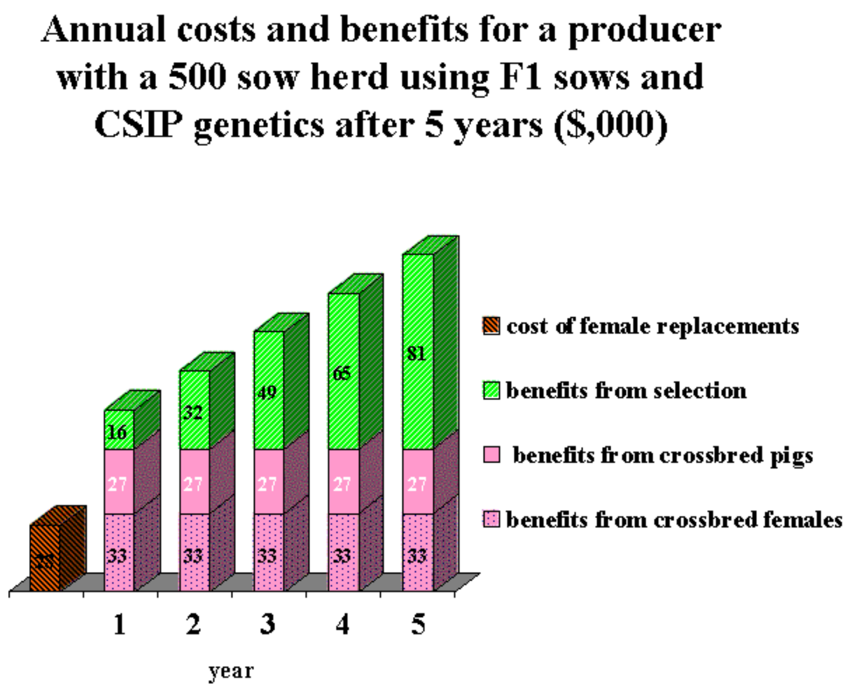
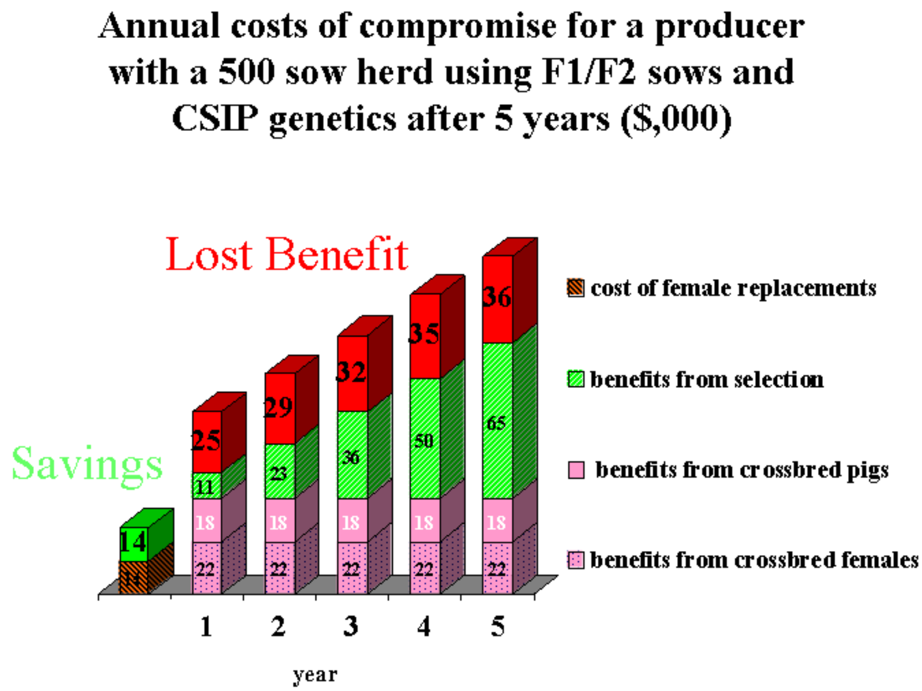



Figure 9 shows an example of the costs of compromising. In this example, the producer decided to only purchase half the number of F1s needed for replacements. The other half were F1s crossed to Yorkshire semen. This saves the producer $14,000 per year in F1 purchases, but now the herd is no longer maximizing the benefits of cross-breeding and is falling further and further behind genetically. The costs are much greater than the savings, totalling $36,000 or $72/sow in year 5.

**Figure 9.** Example cost of compromising on genetic lag and cross-breeding.




## *Conclusions*

1. To know how to profit most from the OlyWest contract, you need to know where you are today with regards to your herd averages and standard deviations for lean yield and lean depth. From there you can look at how much difference changes will make.
2. Changes in average market weight and increasing uniformity can make a large difference.
3. Consider other management changes, such as split sex rearing and marketing, nutrition and health. These factors can influence both carcass averages and uniformity.
4. Be certain that you have access to a good genetic source which is continuing to improve the traits that matter for your profitability. This must include both production efficiency and carcass quality.
5. Minimize the genetic lag between your genetic source and the constantly improving genes flowing into your herd. If the herd is closed it is critical to have access to elite maternal line genetics to breed replacements.
6. Maximize the benefits of cross-breeding by using at least two distinct breeds on the maternal side and a sire line that is a different distinct breed, or a combination of breeds not used on the maternal side. Closed herds need to pay extra attention to maintaining hybrid vigour in their sows.

The impact of genetics on profit from the OlyWest contract is significant, but other management factors can be even more important. It is essential take care of these other factors to maximize the benefits from genetics that are available today.

The impact of genetics on efficiency of production is much larger than on carcass value for the producer. These efficiency ga ins are essential for producers to stay competitive. Make sure you are benefiting from these genetic gains in efficiency and the extra carcass quality will be icing on the cake.