

## GENETICS AND BREEDING



Improvements in reproductive efficiency translate directly to decreases in emissions from livestock operations.

As a producer, you work to better your breeding stock for many reasons, including improved production, product quality and disease resistance.

**Genetic improvement** programs are in place for all common livestock and poultry species, offering increased output from lower input costs. Improved genetics can also reduce greenhouse gas production from livestock operations. An inefficient livestock operation, for example, requires more units of livestock to produce the equivalent output of an efficient operation. As you improve production efficiency, you significantly reduce greenhouse gas emissions.

Increasing **feed efficiency** in cattle can do double duty too, by increasing productivity and reducing greenhouse gas emissions. Scientists are developing new selection tools to increase feed efficiency in cattle through breeding. Innovative methods to easily identify cattle that are genetically superior for feed conversion are becoming available to producers.

Production efficiency can also be genetically improved by breeding for increased **reproductive efficiency**. For example, the number of offspring per sow can be increased through higher pre-weaning survival and lower mortality. Fewer greenhouse gases are produced per unit of output when reproductive efficiency improves.

Many other livestock species have been improved through genetic selection of **growth rate**. Studies have shown that genetically increasing the growth rate will increase the amount of output per unit input, resulting in animals that reach market faster, consume less feed, and more efficiently use fixed resources.

The environmental benefits from increased growth rate in all species are tremendous. More livestock products are produced per unit of greenhouse gas emission. Canadian farmers can increase production of livestock products without increasing the amount of land under cultivation.

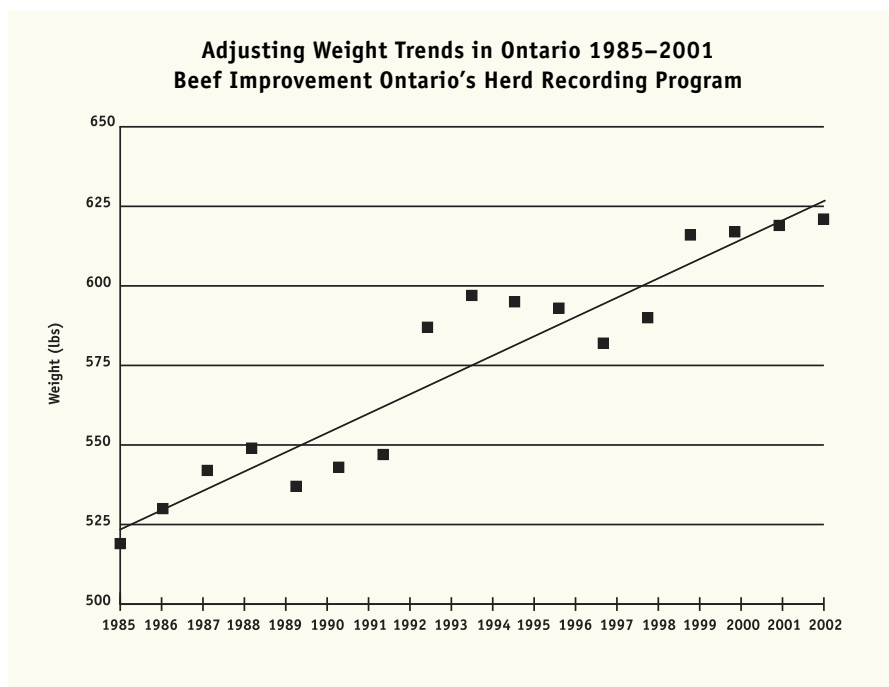
Broiler chicken producers have made great improvements to the productivity and efficiency of broiler birds. Annual rate of genetic improvement for growth rate is about 2.4%, while feed efficiency improves 1.2% per year. This has translated into days-to-market being cut by 50%, and continued improvements are anticipated.



The broiler industry has made great improvements in production efficiency. In so doing, they've also reduced net emissions of greenhouse gases per unit of production.

## KEY BMPS

- ✓ **Select breeding specimens for improved or above-average reproductive efficiency.** Keep accurate records of birth numbers, weights, survival and early development.
- ✓ **Implement a genetic improvement program or source genetically improved livestock for your farm operation.** Benefits: increased productivity, increased output, and increased profit. Greenhouse gas emissions will also decrease due to better utilization of feed, less manure, and reduced time to market.



Genetic improvement has already contributed to lower greenhouse gas production on Ontario farms. Livestock producers have been using genetic selection for growth traits for many years. Results from Beef Improvement Ontario’s herd management program shows the average calf weaning weight has increased from 543 lbs in 1990 to 621 lbs in 2001. According to the Canadian Cattlemen’s Association’s Greenhouse Gas Calculator, this translates to a greenhouse gas reduction of 12.5%, holding other variables constant. And there is potential to increase this benefit in coming years.