

The Genetic Trade-off

There is a trade-off between achieving maximum genetic gain and building up inbreeding too quickly.

TGRM® uses state-of-the-art scientific methods to help find the right balance between these two when selecting and mating your breeding animals.

Optimal Contributions Theory

Maximising genetic gain without considering the impact on future inbreeding will result in higher levels of coancestry (relatedness of individuals – see the fact-sheet Coancestry) and this will lead to undesirable levels of inbreeding (see the fact-sheet Inbreeding). There is an optimal balance between high genetic gain and low coancestry, achieved by using individuals in an optimal way. This is known as Optimal Contributions Theory.

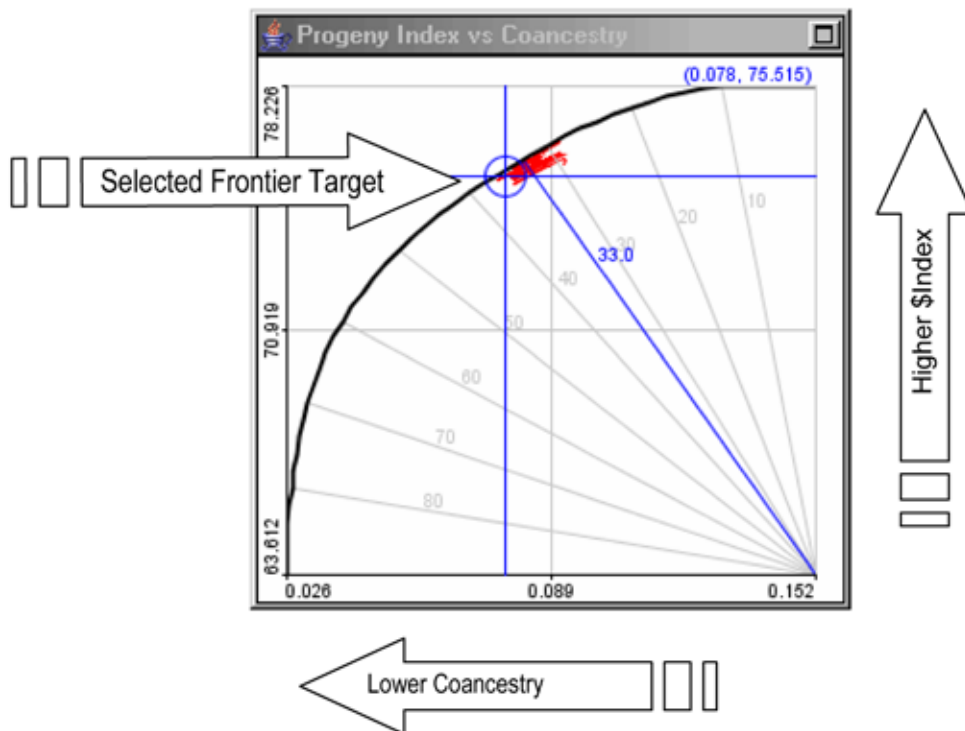
Achieving the optimal contributions of individuals' genes to the breeding program results in genetic gain that is more sustainable over time because it will not cause an excessive build-up of inbreeding in future.

You could achieve sustainable genetic gain by taking a conservative approach that keeps coancestry at bay, but this level of genetic gain is often less than desirable.

Use TGRM to balance genetic gain and coancestry...



TGRM® will calculate the highest genetic gain that is possible, and the corresponding level of coancestry, the lowest possible coancestry with the corresponding level of genetic gain, as well as a number of points in-between the two. Connect up the points and you have the “frontier of genetic gain and coancestry”.



This represents the best that your breeding population can do this year, given the constraints you have put on sire uses and the number of females being mated. Each point on the frontier is a mating list that you could implement, not a theoretical position.

We use this frontier to explore the range of possibilities for index and coancestry, and as a starting point for adding other goals and constraints, such as minimisation of the inbreeding in the progeny of these matings, manipulation of trait distributions, and inclusion of major genes.

By knowing what you can achieve, you are in a better position to make decisions about the trade-offs between the different components of your breeding program and the various factors to consider when planning the year’s matings.

