

Genetic evaluations for TB Advantage



Figure 1. *Tubercle bacillus* is a bacterium that causes tuberculosis

What is TB Advantage?

TB Advantage is a genetic index published by AHDB Dairy to help dairy farmers make informed decisions to breed cows which have an improved resistance to bovine tuberculosis (bTB).

The index follows extensive research into the genetics of bTB, undertaken jointly by the University of Edinburgh, Roslin Institute and Scotland's Rural College (SRUC), and which was supported by Defra and the Welsh Government. Their work showed genetic variation between animals and formed the basis of the TB Advantage, the first genetic index of its kind in the world.

Initial development of the index used data on over 650,000 Holstein cows who have bTB data recorded by the Animal and Plant Health Agency (APHA). This data was combined with 87,683 Holstein cows in April 2017, supplied by the Department of Agriculture, Environment and Rural Affairs (DAERA) in Northern Ireland. From this data, breeding patterns have been established and more resistant bloodlines identified. TB Advantage is available for all traditionally evaluated dairy breeds, but genomic Predicted Transmitting Abilities (PTAs) are currently only available for the Holstein breed. Work is also underway to establish if the index can be extended to beef breeds.

It's important to note that breeding cattle with a reduced susceptibility to bTB is a long-term approach to disease control and should comprise just part of a much broader

eradication strategy. All other existing and emerging control measures, therefore, remain critically important and should continue to be taken to protect cattle against bTB, irrespective of the choice of bull.

How to use TB Advantage

TB Advantage can be used as part of a range of important genetic traits to form a balanced breeding plan for the herd; this way the herd's strengths are maintained and weaknesses improved. The degree of emphasis on the TB Advantage may further depend on whether the herd is within or close to a TB affected area or not.

The index indicates the degree of resistance to bTB a bull is predicted to pass on to his offspring and is expressed on a scale which, typically, runs from -3 to +3 and, as for most other traits, positive values are desired. For every +1 point in the index, one per cent fewer daughters are expected to become infected during a TB breakdown.

TB Advantage has small but favourable relationships with all traits currently in the UK breeding indexes, Profitable Lifetime Index (£PLI) and Spring Calving Index (£SCI). Selecting bulls with positive TB Advantage will therefore, on average, have no detrimental effect on any other trait. However, farmers should look at each bull on a case-by-case basis, as any individual could have weaknesses that should be avoided for a particular herd.

A few considerations when using the index

TB Advantage is available for all sires that have daughters milking in the UK (daughter-proven bulls with milking daughters in at least 10 herds affected by bTB) or Holstein bulls which have had their genotype (DNA) measured (young genomic bulls). Holstein females which have been genotyped will also be given a TB Advantage rating.

The reliability for the TB Advantage ranges from 20 to 99 per cent, with an average reliability of 65 per cent for bulls with UK daughters, and 45 per cent for those with a genomic index only. Although the reliability of genomic predictions for the TB Advantage is currently less than for some other indexes, it can still be used as part of a dairy herd's breeding strategy and has shown to be valuable in predicting future performance.

Development of TB Advantage

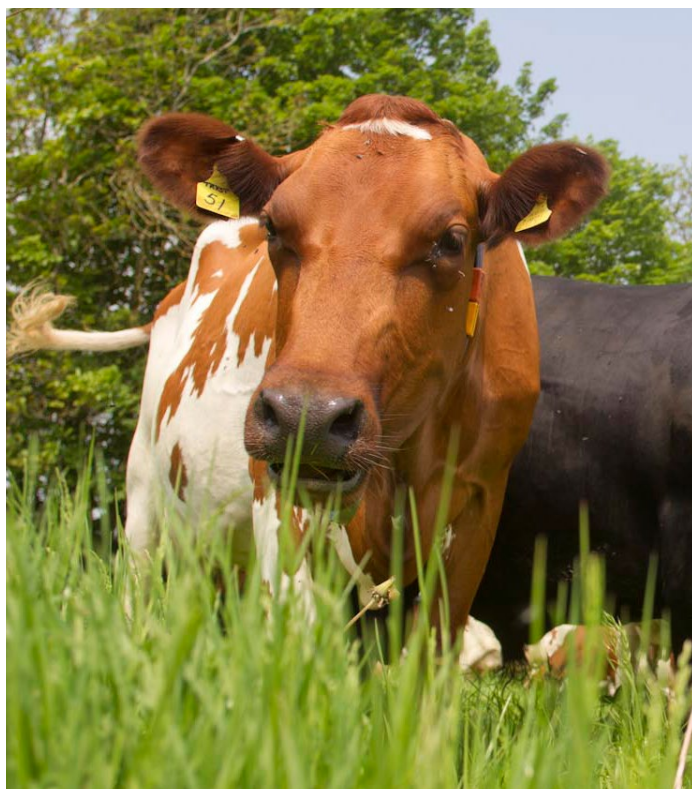
What does this mean for dairy cattle selection?

By selecting bulls with high PLI or SCI the UK dairy industry has already been, indirectly, selecting for desirable TB Advantage in the national herd. This genetic index is an additional tool which now allows farmers to directly screen out the most negative TB Advantage bulls from their short list of bulls.

Due to the nature of dairy cattle breeding, this is a long-term aid to be used, in addition to current eradication policies already in place. But, the decision to breed for improved resistance in your herd is a permanent benefit which accumulates with each new generation.

Author

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Further information

Where to find TB Advantage

- PTA's for TB Advantage is now available on all bull reports and is part of the national genetic and genomic evaluations provided by AHDB Dairy in April, August and December each year. The PTA and reliability is included in the 'Management Traits' section of the bull factsheets, which can be found through the £PLI and £SCI bull reports.
- For more information, please visit the AHDB Dairy website: dairy.ahdb.org.uk/breeding



- The TBhub is the UK home for TB information. It is a joint industry initiative, launched in autumn 2015, aiming to be a one-stop shop for beef and dairy farmers to find practical advice on bTB, from wildlife and cattle biosecurity to trading rules and guidance on managing a TB breakdown. It has been developed and will be maintained by AHDB, APHA, BCVA, Defra, Landex and the NFU on behalf of the broader cattle industry. Find out more about how to prevent the spread of bTB and other management measures you can take on farm: visit www.tbhub.co.uk or email info@tbhub.co.uk

Want to know more?

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