

Large scale genomic testing within herd does not affect contribution margin

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A Danish study from 2012 shows that genomic test of all or part of the females in a Holstein herd gives roughly the same economic result as not performing any genomic test at all. For RDC and Jersey there is never profit in testing all herds. However, we expect that lower prices for testing in the future, will make genomic tests more attractive.

Genomic tests can be used in different ways. They can be used to select potential bull dam or females for MOET or they can be used as a management tool. The economics in the latter is the topic of this paper.

The idea is to select the genetically best females to produce next generation of heifer calves and use the rest of the females to produce calves for other purposes. This will result in increased profit if the benefit outweighs the cost of genomic testing.

Surplus of females is a prerequisite

The benefit from using genomic tests as a management tool comes from more accurately selecting the best females as dams of the next generation of heifer calves and thereby achieving a larger genetic progress.

If all females are needed to produce the next generation of heifer calves there is no possibility to select, and genomic testing will have no effect. A high reproductive efficiency, low calf mortality, low replacement rate and/or use of sexed semen is therefore required.

Genomic information gives more accurate breeding values

Information from genomic test will increase the accuracy of the breeding values. Females that are genomically tested have accuracies, which are considerably higher than pedigree indices. By using genomic tests we can be more certain that the selected females are actually the best genetically.

Economy in different scenarios are analysed

In the present study varying intensities of performing genomic tests and using sexed semen are analysed. In the study the genetically best females were inseminated with sexed semen from the best dairy bulls and all others were inseminated with conventional semen or semen from beef sires to produce offspring with better meat production traits. All scenarios were compared to the economic result from using no genomic tests and no sexed semen.

The scenarios that were tested were insemination of 40-80% of heifers with sexed semen or insemination of both heifers (40-60%) and 1st lactation cows (20-40%) with sexed semen.

The animals being chosen for genomic test can be defined in different ways. All females can be tested, but the value of the genomic test is largest when females change rank relative to the truncation level. The truncation level is the level where heifers above are inseminated with sexed semen and females below are inseminated with conventional semen. It is therefore also a possibility only to test the heifers around the truncation point.

All preconditions about prices, reproduction, replacement rates are as average in Denmark.

Use of genomic tests does not affect contribution margin

Results are shown in table 1 as yearly contribution margin (DB in Danish) for a herd with 200 Holstein cows compared to a standard situation with no use of sexed semen and no genomic tests. In general there is only a small effect of using sexed semen and genomic tests. In the most optimal situation there is only an increased net profit of 40.000 DKK for the entire herd. The use of sexed semen without genomic tests can explain this increased contribution margin (green in table 1).

Use of genomic tests in results in a lower contribution margin compared to not testing in most scenarios (red in table 1), however in a few cases genomic tests is slightly more profitable compared to only using sexed semen (dark blue in table 1)

Table1. Extra annual contribution margin (1,000 DKK) compared to a scenario with no sexed semen and no genomic tests. Holstein herd with 200 cows

		Sexed semen scenarios							
Heifers, %		0	40	60	80	40	40	60	60
Cows, %		0	0	0	0	20	40	20	40
GT scenarios	No genomic test	Ref.	30	20	30	30	30	30	40
	25 % centred	-10	20	30	20	30	40	40	40
	50 % centred	-10	20	30	10	10	10	40	30
	50 % best	-10	20	20	20	20	30	20	30
	All	-30	-	10	-20	-	10	-	20

Results above are only valid for Holstein herds. For RDC and Jersey prices for genomic tests are the same as for Holstein, but the tests' accuracy is lower. This means that the economic results from using genomic tests will be less favourable for these breeds.

Lower price on genomic test and sexed semen will improve economy

In 2013 VikingGenetics will lower the prices on sexed semen and genomic tests. This will make it more attractive to use sexed semen. Lower prices on genomic tests will tend to make it economically better to use genomic test, and turn more of the scenarios in table 1 "blue". However, the conclusion is still the same that genomic tests are only valuable if the results will lead the manager to make other decisions regarding the genotyped females.