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The Centre for Integrative Genetics at Ås

Established in 2003, the Centre for Integrative Genetics (CIGENE) is a national facility for SNP genotyping of livestock, poultry, fish and plant genomes with a staff of 35 scientists. Matthew Kent, a researcher who leads the administrative component of CIGENE, described its activities in an interview with NBS Nytt.



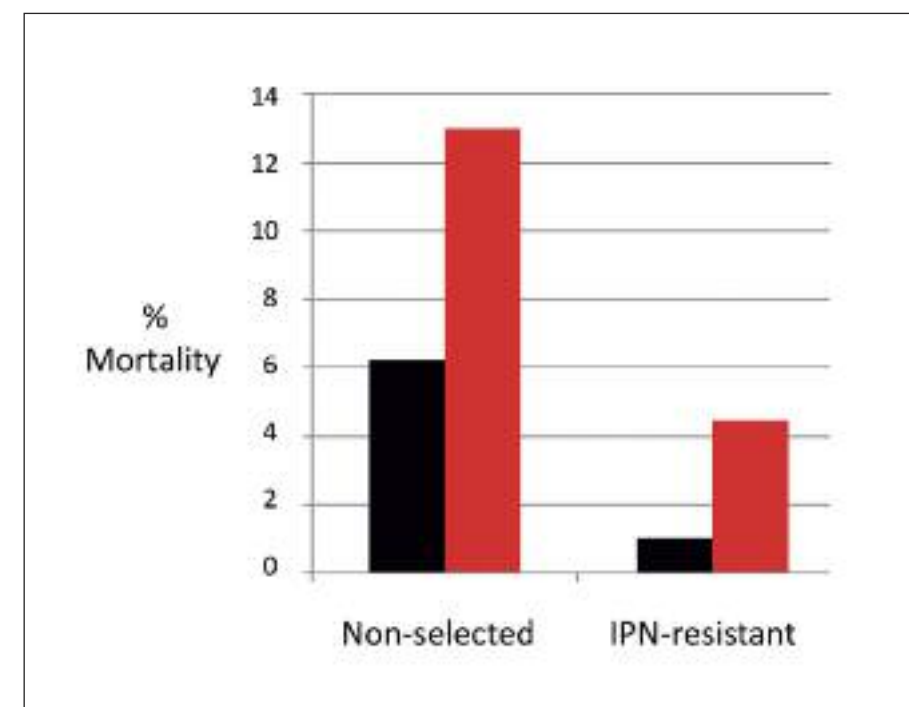
As a research center at NMBU, CIGENE has joint projects with other universities in Norway as well as with breeding companies such as AquaGen (fish), Norsvin (pigs), Graminor (plants) and Geno (cattle). Some of the companies actually have offices and lab benches at CIGENE.

Focusing on SNP profiling for breeding, CIGENE feels that it is internationally competitive in this field based on, among other things, unique SNP arrays for cod (10,000 SNP chip), salmon (500,000 SNP chip), rainbow trout (50,000 SNP chip) and brown trout (6,000 SNP chip). In addition to the commonly used Illumina technology for SNP screening, CIGENE uses an Affymetrix platform based on the GeneTitan instrument. The GeneTitan is an automated system for hybridization, ligation and imaging. A single machine can process as many as 700 samples per week.

Matthew Kent cited two concrete examples where SNP screening at CIGENE is directly impacting breeding today.

The first example involves Norsvin's commitment, starting in 2014, to use screening results with the Illumina 60K Porcine SNP chip to guide their breeding programs for male pigs and for semen (1).

The second example involves AquaGen's work with the IPN (infectious pancreatic necrosis) resistance genes in salmon and brown trout. A major QTL for IPN resistance was discovered in salmon in 2008 (2). By 2009, AquaGen was selling salmon eggs for fish farming that were selected for the IPN resistance gene. Marketed as QTL-eggs,



Average mortality for newly-hatched (black) and 1 year old (red) salmon in 2011 at 44 different fish farms in western Norway. Mortality after 90 days was scored for fish that were either non-selected or IPN-resistant. Figure is based on results from AquaGen 2013.

the use of these IPN-salmon eggs resulted in more than a 50% decrease in the incidence of IPN during 2009-2012 (Fig. 1). QTL-eggs for rainbow trout will become available from AquaGen in 2015.

Finally, Matthew Kent discussed the long-term project at CIGENE to sequence the Atlantic salmon genome. This project began in 2004 and has involved partners in both Canada and Chile (3). A recent popular article in the Norwegian press (4) describes the strategy forward with regard to the salmon genome; namely, first genome assembly and then development of a 'digital' salmon model.

References

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