



To the Members of Speckle Park International,

The growth of this breed is rapid and exceptional, with over 460 members of the company, Speckle Park International now hosts the largest herd book of Speckle Park cattle globally. We as the Speckle Park International Board of Directors and CEO are proud to represent you and your investment and do not take your trust in us lightly. We are dedicated to the cause of developing, promoting, and enhancing the breed of Speckle Park cattle, and genuinely wish to see every member, stud and breeder of Speckle Park prosper.

In our endeavors to do so, the matter of Gonadal Hypoplasia (GH) has come to the fore in recent years, and with it some murky and unclear information. Therefore we thought it may be pertinent to provide some background and provide clarity on a number of the common questions and misconceptions surrounding the matter of GH and the realities of developing a commercialised DNA test for Gonadal Hypoplasia (GH) for Speckle Park International members.

### **What is Gonadal Hypoplasia:**

In simple terms the lack of or underdeveloped gonads in either a male or female. Gonadal Hypoplasia is characterised by aberrantly small and underdeveloped gonads, in both sexes. Impaired migration of primordial germ cells during embryonic development causes hereditary gonadal hypoplasia in both sexes of Northern Finn cattle and Swedish Mountain cattle. Most affected animals present left-sided Gonadal Hypoplasia. However, right-sided and bilateral cases have also been found. This type of Gonadal Hypoplasia prevails in animals with white coat colour, but further research is required.

### **The Background:**

The matter of GH was first brought to the attention of the Speckle Park International Board of Directors in very late 2018/early 2019. In response to this, the Board of Directors investigated if a DNA test to identify GH carriers was readily available via the genotyping companies. No individual board member was tasked with this role specially. It became readily apparent that this was, and continues to be the case that no test is available to identify GH carriers. Therefore, if Speckle Park International wished to be able to test for GH in any way in the future, then we would need to put the time, effort, and resources into the development a DNA test ourselves.

The development of a DNA test is not a simple and fast process.

In very basic terms, it requires the collation of samples from animals believed to have been affected, the

DNA sampling and testing of these animals to obtain a genotype (the animals DNA blueprint) and then those genotypes are assessed, looking for the genes that are believed to be linked to the condition, in this case GH. From there a DNA test must be developed and validated before it can be commercialised for public availability. Key aspects that impact the speed of a DNA tests development is the number of samples readily available (the more the better) and the number of genes that may be involved (the more genes involved the more complex it becomes).

Given that there is no DNA test available to identify animals with GH, and the complexities involved in the development test and the resources required, it became apparent that SPI could not manage this with the limited resources available back in 2019. Therefore, the Speckle Park Board of Directors proceeded with the formation of the Technical Sub-Committee as well as enlisting the services of Professor Dr. Jon Beever, AgResearch Institute of Agriculture, University of Tennessee.

Professor Dr. Jon Beever is a leading expert in his field of Genomic Research in Agriculture, having worked with a number of large breed societies in the USA to identify breed specific genetic conditions, including the American Hereford Association and American Angus Association, and has published over 165 scientific papers. Dr. Beever serves a Director on the Board of the University of Tennessee Institute of Agriculture and is widely regarded internationally.

Initial samples from believed GH affected animals were sent over to Dr. Beever in early 2020. The sample numbers were small but allowed SPI to make a start. Notices regarding Speckle Park International's work on GH were mentioned in the August 2020 Newsletter (pg 3), the 2020 Speckle Park Annual (pg 53) as well as via email blasts over the course of 2020.

### **The Current Situation:**

Dr. Jon Beever met with the SPI Board of Directors in early 2021 to present some initial findings, based off the small number of samples submitted. There are no definitive results from the initial research that can tell someone if their animal is a carrier or not.

3 important things were noted out of the initial findings:

1. That there was a chance of GH being "colour-sidedness" i.e. linked to coat colour. Early suggestions have been that this "colour-sidedness" related to white animals.
2. GH appears to be a recessive condition with incomplete penetrance.
3. There is an association with allele Cs29 translocation

To break down point 2 in greater detail this means 2 things – recessive means that to be affected an animal must be carrying 2 copies of the gene linked to GH. Incomplete penetrance is when some animals that carry the genes express the trait (in this case GH) while others may not express the trait. These words (recessive and incomplete penetrance) are important to understand when discussing GH and its research and we recommend if anyone is unclear on the definitions of these terms to do your own reading to understand these terms, as the fact that initial research has shown GH to have incomplete penetrance adds another layer of complexity to the research and speed of developing a test for GH.

The advice out of the meeting with Dr. Beever in early 2021 was that SPI need to obtain more samples to further understand the relationship between GH, coat colour and the Cs29 allele. Therefore, under this advice, the next stage of sample collection began, whereby SPI called for members with 15+ white females to collect and submit samples. The purpose was to confirm or deny the initial findings presented as outlined above. An email was sent to the members on the 4<sup>th</sup> of March requesting any interested participating herds to come forward, with SPI sample collection protocols being uploaded on to the SPI website. Follow up emails sent in April and June 2021 requesting more samples from the membership.

To those herds who have submitted samples at their own cost and effort, we greatly thank you, as this has allowed us to submit further samples to Dr. Beever to continue on with this important research into GH. We cannot proceed without the positive support from the membership. The most recent sample submission to Dr. Beever has meant we have met the recommended sample numbers desired to continue with the research into initial findings and allowed us to call for samples from the membership from any other animal in the Speckle Park population suspected to be a GH affected animal.

We take the matter of confidentiality seriously and are cautious of the ramifications of announcing animals as carriers or affected with no validated DNA test. All samples submitted to SPI are de-identified for confidentiality and to remove bias. To simply presume an animal is a carrier based off parentage is fraught with danger. The naming of animals believed to be carriers or affected animals without scientific proof risks damaging the reputation of that animal, its breeders, and our breed to the wider beef industry. Presumed GH animals such as a bull with a small testicle may be due to environmental factors or injury. Determining if an animal is a GH carrier should and will be determined by science.

If you have any samples from animals, you believe are affected by GH and would like to be a part of this important research, then please get in contact with the SPI office to discuss sample submission.

A sample submission form that outlines the process can be found on our website ([www.specklepark.org](http://www.specklepark.org)) and will be updated as the research project progresses, as advised by Dr. Beever.

### **The Future:**

At present there is no DNA test available to identify carriers of GH, nor are there any results for available for individual animals from the initial research.

To identify potential affected animals, SPI recommend that breeders consult with their vet and conduct a manual examination of the animal, along with stringent management practices.

SPI do not recommend breeding animals believed to be affected with GH. Despite what some may have read, there is no way to gain a commercial advantage without a validated DNA test that identifies carrier animals – to reiterate, this does not exist yet.

Those herds who have already implemented stringent scanning and palpation management plans with their qualified vets have simply taken the first step at managing risk. This method is available to all breeders.

As to the future of this research into the matter of GH, this is where we need continued assistance from the membership in identifying potentially affected animals. We continue to require samples from the wider Speckle Park breeder network and encourage you to assist us in this research project.

We will continue to work with Dr. Beever and we will continue to provide progress reports to our members as information becomes available.

SPI is dedicated to continued research into GH and bringing a solution to the members of Speckle Park International. SPI is and continues to be the only recognized governing body of Speckle Park Cattle in Australasia, with over 460 members, and boasts the largest herd book globally for Speckle Park Cattle with a female inventory of over 3300 in 2021. The SPI office is in regular contact with the Canadian Speckle Park Association, who are in full support of the research SPI are conducting into GH.

As the two recognized governing bodies for Speckle Park cattle globally we will continue to support each other on matters of importance to the Speckle Park breed, its breeders, and the wider beef industry