

## The 5 'W's" of PHA

### What is PHA ?

PHA is a lethal genetic mutation. Each gene inherited from each parent is responsible for a part of the newly constructed fetus and this mutation made the instruction become incomplete for the development of the lungs. Literally, Pulmonary means 'having to do with the lungs', Hypoplasia means, 'under-development or incomplete development of an organ', and Anasarca means 'the filling of fluid'

A PHA affected calf, may be aborted early in the pregnancy, but if carried to term is stillborn and the resulting Anasarca means that it will be so full of liquid that natural birth is impossible and intervention, usually by caesarian section is required or the cow's life could be endangered.

Although it exists in other breeds of cattle, the specific gene causing 'Dexter PHA' is different and was discovered by Dr. John Beever, of Agrigenomics in the USA just last year. Does this mean that PHA is new to our Dexter herd? No PHA has been around a long time, often resulting in abortions in the first trimester but sometimes a full term fetus was mistaken for a bulldog calf, as was the case of an Ontario breeder a couple of years ago. PHA is not new but the newly discovered gene causing PHA means that we are now able to test our animals and prevent its occurrence.

### When can a PHA affected calf happen?

The PHA mutated gene is recessive and so a fetus must inherit two copies of the gene in order to be PHA affected. This means that **both** sire and dam must be carriers of the gene to produce a PHA affected calf.

The mating of a PHA carrier Cow and a PHA carrier Bull has a 25% probability of producing a dead PHA affected calf, possibly endangering the life of the cow, a 50% chance of producing another PHA carrier and a 25% chance of producing a non- carrier or PHA Free calf. Don't forget that these mathematical probabilities are based over a large sample herd. If you have one cow and she is a carrier and she is bred to carrier bull, resulting in a PHA affected calf.... Suddenly your 'probability' factor becomes 100%! **The best 'probability' is NO probability. Know the status of your animals!** The mating of a carrier animal with a non-carrier animal will never result in a dead PHA affected calf, but there is a 50% chance of producing another PHA carrier.

It is important to remember that the PHA gene is Mendelian in inheritance. This means that a carrier animal will either pass the PHA mutated gene or the good gene copy each time they make a new calf. It doesn't matter how many

generations ago the pedigree has a known carrier, the gene is not watered down with each passing generation, it's either there or not.

However when the sire and dam of a calf are tested negative, then it no longer exists in the calf or their progeny, as long as they are bred to non-carrier animals. Just like it cannot be watered down, it cannot just reappear. This is why we must test and share our results.

### **Who should be concerned and test?**

Anyone who owns a cow or bull whose pedigree is 'at risk' of carrying PHA

PHA in Dexters has now been positively identified in **Woodmagic Wheatear**, a very prolific cow who has nine registered offspring and many descendants in the Canadian Herd. She was identified as an 'obligate' carrier, with the positive testing of Earlona Fillsey, a great great grand daughter, whose hairs were submitted for testing by J. Potter in the U.S. Fillsey's results as a PHA carrier, in turn make her dam, Aldebaron Bridgit, an 'obligate' carrier but because Bridgit has Cranworth Yanna from Woodmagic Wheatear on both sides of her pedigree it is impossible to pinpoint which of Yanna's progeny, Aldebaran Pennyroyal or Cranworth Clipper inherited her faulty gene. Up until this recent positive that leads us to Wheatear, one of her sons, **Aldebaran Priapus**, an influential international AI bull, positively identified by semen as a carrier, had been the farthest back that we could trace the mutation. His son, **Trillium Chabotte**, unfortunately also an influential AI bull, had also been identified by semen, as a PHA carrier. Because of the unknown status of Wheatear's other progeny, anyone with an animal **with Wheatear in the pedigree**, has, until you know otherwise, a pedigree at risk.

**Don't forget that your animal's pedigree is like a family tree and goes back farther than the three generations, shown on the registration paper. The CLRC pedigree site, makes it easy to check. Just click on each last animal appearing on the page of your pedigree paper and you will get the next generations in that pedigree.**

Only testing and sharing/knowing the results will show whether the pedigree remains at risk. PHA does not get watered down, it's there or not. Similarly, if your cows and bull are free of PHA, they can never have a PHA carrier offspring.

### **Where do I look for more information?**

Both American Associations have information about PHA on their websites. Easily accessible navigation for the general public is the ADCA site. They talk about PHA <http://www.dextercattle.org/genPHA.htm> and the ADCA pedigree site also has a list of carriers and non carriers which is being updated daily, as

members' test results come in. There are some Canadian animals listed, but as importantly, obligates, either carrier or non, that are Canadian can sometimes be identified by looking at the pedigrees. This can help us know whether our animals should be tested.

The PDCA site is a bit more difficult to navigate but the link is <http://www.purebreddextercattle.org/> Go to 'membership info' and then to the 'PDCA Certified Program' and then click on 'Chondrodysplasia and PHA' at the bottom of the page.

As Canadians, we need to test and we need to share the results to help each other. Members of the Yahoo group have been encouraged to do this, and many of us have. There is a data base of Canadian animals, whose status is known. Hopefully this data base will grow as more of us test and share the results. The link to the Yahoo chat group is

<http://tech.groups.yahoo.com/group/canadiandextercattle/> Membership there is only based on membership in the CDCA.

### **Why should I test?**

You should test first for economic reasons. A cow who 'slips' or aborts early in her pregnancy or veterinary bills at calving don't make economic sense.

You should test because as word spreads about PHA, newcomers to Dexters are going to ask the status of your animals before buying.

Finally and most important, you should test because we love this breed and are concerned about the health of our National Herd.

### **How do I test?**

Testing now is as simple as pulling tail hairs, **Igenity Labs** has a very user friendly approach, sending results by email and regular mail. To order your kits <http://us.igenity.com/Default.aspx> The kits are free, couriered to your address and the test is \$26 Canadian. Igenity is also clearly marking that it ran the test for the Dexter PHA mutation. **Pfizer Labs** now also has the ability to perform the test with tail hair and to order your kit there go to

<http://www.pfizeranimalgenetics.com/sites/PAG/Pages/orderform.aspx>

For anyone wishing to send blood or semen use **Agrigenomics**

<http://www.agrigenomicsinc.com/> This is fairly costly because blood must be sent 'live' so the vet must come, draw blood and then courier it down to the lab. If you choose this route, then you must have a copy of the 'vector permit' for the lab ready when the vet comes to get the blood. This was available at the CLRC, through Ron Black.

**The important part is to TEST and then to share the results with as many people as you can that have the same ancestors in their animals' pedigrees as you do.**