

Quality Control Program

The Canadian Charolais Association has always maintained a keen interest in monitoring any genetic abnormalities within the breed. One such congenital defect is the Syndrome of Arthrogryposis and Palatoschisis (SAP). Congenital defects are defined as abnormalities of structure and/or function at birth. Arthrogryposis is described as a permanent abnormal contracture of the joints of the legs. This deformity has also been referred to as crippled, twisted or crooked legs. Arthrogryposis is often accompanied by cleft palate, which is an abnormal opening in the roof of the mouth.

Affected calves are of both sexes and may be born dead or alive. Calves born alive will not usually survive. The calves are unable to stand after birth; the elbow, knee and fetlock joints of the front legs are flexed in permanent contraction. These legs cannot be straightened manually. The hind legs are either extended straight backwards or kept in a sickle-like position and cannot be straightened out.

Arthrogryptic calves have other defects. Some of these may be noted visually, others require laboratory examination. The kneecap is considerably smaller and the lower end of the canon bone is abnormally shaped. The spinal column is twisted in many calves. The muscles of the legs are wasted and are of yellow or mottled yellow and pink color.

If calves with crooked legs are encountered, the mouth should be opened and examined for a cleft palate. Arthrogryposis (crooked and stiff limbs) associated with cleft palate is considered to be hereditary. The inheritance is considered to be recessive, in other words both the sire and the dam must carry a defective gene.

Accurate diagnosis of the condition is extremely important for the following reasons:

1. The expression of the defect is variable, visual appraisal alone will not give an accurate diagnosis. Blood testing for parentage verification and detailed pathology examination are necessary.
2. Arthrogryposis can be nutritionally induced (manganese deficiency), toxically induced (lupine, hemlock, locoweed) or infectionally induced (Akabanes Cache Valley disease). It is imperative that accurate descriptions and reporting aid the diagnostic procedure to determine a possible cause.
3. Work is ongoing at the University of Saskatchewan, through research of DNA (Deoxyribo Nucleic Acid) testing that genetic Arthrogryposis SAP may be identifiable before animals are of breeding age. However, in reality, identification from this method is still sometime hence. Identification at this stage is still determined by visual inspection and laboratory techniques.

This information is provided to update the breeders of the process to follow in the case of an unusual birth defect in a calf. The statistical frequency of reported cases of Arthro (SAP) with the Charolais population is extremely rare. The Board of Directors, acting on behalf of the

Association, seeks to continue to assure the existence of a high level of quality control in the breed.

Canadian Charolais Association Quality Control Policy

When any bull is shown to be a carrier of the gene causing the arthrogryptic syndrome (SAP) by having contributed the defective gene in direct lineage to one or more of his descendants, that:

1. On the basis of the first verified case, the bull owner shall be notified.
2. When a second verified case is reported in a different herd or in the herd of the owner of leasee, and providing a parentage has been authenticated by blood typing and or DNA testing, the Association shall proceed with action as provided under Paragraph 4 of this Policy

OR

3. When four (4) verified cases have been reported from a single herd and provided that parentage of at least one has been authenticated by blood testing, the Association shall proceed with action as provided under Paragraph 4 of this Policy.
4. The Association shall:
 - a) notify the bull owner of the findings
 - b) allow a reasonable period of appeal for a complete review of all the facts pertaining to the case(s).
 - c) after the appeal process and upon confirmation, recommend to the bull owner that he remove the carrier bull from the semen market.
 - d) notify any stud unit known to handle semen from the identified carrier
 - e) recommend to provincial association sponsored sales that sons of the carrier bulls be refused entry
5. The Association shall maintain a continuously updated list of identified carriers and shall:
 - a) notify provincial associations and the primary sales services of such carriers
 - b) when requested by a member of the Association in good standing, make this list available.

The following is a list of bulls identified as carriers of the defect over the years. Use of the progeny in breeding programs should be avoided.

Name	Reg #	Name	Reg #
Etienne JB 3	MC 29	Basile	FMC 38
Amiral	FMC 2	Club	FMC 103
Bevon Jr JB	MC 22	Cheribibi	FMC 118
Christiana	FMC 234	Ali Baba (Lesueur) A14	FMC 1
Hidalgo BM	FMC 1316	Gedeon	FMC 1019
Habitant Etats Unis D10	FMC 955	Cardinal Creek Big T	MC 17912

Syndrome of Arthrogryposis and Palatoschisis (SAP)

SAP is an inherited congenital defect in Charolais cattle, meaning that it is present at birth. The genetic condition is marked by deformed limbs (Fig. 2) and a cleft palate (Fig. 3). Limbs are typically contracted and may be referred to as crippled, twisted or crooked legs. Hind legs may be straight backwards or in a sickle position. Limbs cannot be straightened out. Many calves are also born with a twisted spinal column.

		Carrier Male	
		A	a
Carrier Female	A	AA	Aa
	a	Aa	aa

		Carrier Male	
		A	a
Normal	A	AA	Aa
	a	AA	Aa

Figure 1. SAP is inherited as a simple recessive pattern. Aa is a carrier of the SAP or “a” gene, “AA” is normal, and “aa” is an SAP affected calf.

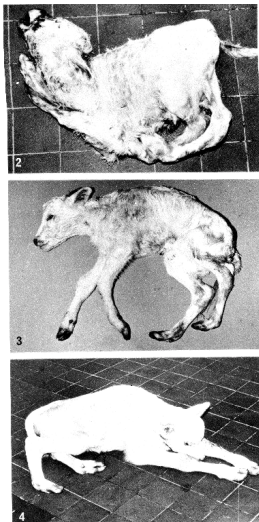


Figure 2. Examples of deformed calves

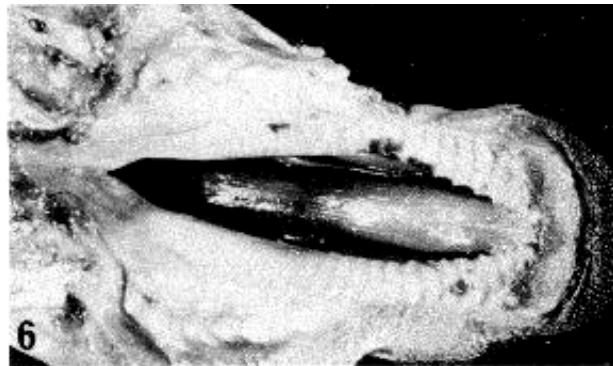


Figure 3. Example of a cleft palate

Calves may be born alive, however the majority are born dead and most will die shortly after birth. Calves of both sexes may be affected. While incidence of SAP is rare, due to the seriousness of the condition it is extremely important that it is accurately diagnosed and properly dealt with.

Possible causes of Arthrogryposis include:

- manganese deficiency
- toxicity such as lupine, hemlock or locoweed
- infection such as Akabanes Cache Valley disease
- genetic marked by deformed limbs and a cleft palate

If a suspect calf is born it should be examined by a licensed veterinarian and sent to a pathology lab for a complete examination. As well, a DNA or blood sample should be taken from the calf and the dam for parentage verification.

Herd Owner: _____
 Address: _____

 Postal Code: _____
 Phone #: (_____) _____ - _____

Return To: Canadian Charolais Association
 2320-41st Ave NE
 Calgary, AB
 T2E 6W8
 Phone: (403) 250-9242
 Fax: (403) 291-9324
 E-mail: cca@charolais.com

Reporting Form for Suspected Case of Syndrome of Arthrogryposis and Palatoschisis (SAP)

If not decomposed the calf should be sent to a Pathology lab. Photographs of the calf and an inspection report from a licensed veterinarian should also be sent to the CCA whenever possible. DNA samples on the calf and its dam should be sent to:

Maxxam Equitest Inc., 335 Laird Road, Units 4/5, Guelph, ON, N1H 6J3

Detailed Description of Affected Animal:

Twisted/Deformed Limbs: Y / N Cleft Palate: Y / N DNA Sample Was Taken: Y / N
 Birthdate: ___/___/___ Sex: M / F Birth: Single / Twin / Other ___
 Animal was Born: Alive Stillborn Died Later
 Calving Ease: Normal Malpresentation Hard Pull Surgery

Was the animal attended by a veterinarian? Y / N If so please complete:

Name:	Address:
	Phone #: () -

Dam Information:

Name of Dam:	
Registration #:	Tattoo:
Has the Dam had a history of other abnormal calves? Y / N	
If Yes, please describe _____	

Sire Information:

Name of Sire:	
Registration #:	Tattoo:

Service Information: AI Natural Embryo
 Exposure Dates: From ___/___/___ To ___/___/___

Other possible exposures:		Date	
Sire Name	Registration #	From:	To:

Has a similar condition occurred before in the herd? Y / N

If Yes, please describe: _____

I certify that this information is true and correct to the best of my knowledge and belief. The Canadian Charolais Association has my permission to use the above information as it may determine.

Signature of Owner Making the Report: _____

If any assistance is required please do not hesitate to contact the Canadian Charolais Association.