



THE GLOBAL STANDARD
FOR LIVESTOCK DATA

Current Status and Activities of the ICAR DNA Working Group

Brian Van Doormaal
Chief Services Officer (CSO)
Lactanet Canada
bvandoormaal@lactanet.ca

Chair, ICAR DNA Working Group



Réseau laitier canadien



Canadian Dairy Network

A large, blue, stylized bracket on the left side of the image, grouping the logos on the left and pointing towards the "Lactanet" text.

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Background



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- ICAR currently has 17 active groups, either Sub-Committees (such as Interbull), Working Groups or Task Forces
- First meeting of the DNA Working Group was held in October 2016
- Other members currently include:
 - André Eggen (Illumina)
 - Romy Morrin-O'Donnell (Lab)
 - Suzanne Harding (Breeds)
 - Nilesh Nayee (Global Reach)
 - Dariusz Kamola (Lab)
 - Ezequiel Nicolazzi (GEC)
 - Sandra Kipp (GEC)
 - Wim van Haeringen (Lab)
 - Raffaele Mazza (Lab)
 - Jiansheng Qiu (Lab)
 - Matthew McClure (Industry)
 - Joanna Senddecka (Interbull Centre)



ICAR DNA-Related Services



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ICAR Accreditation for Genotyping Labs

- Test quality of DNA genotyping services using ISAG ring test
- Includes microsatellite parentage verification

ICAR Accreditation for DNA Data Interpretation Centres

- Test internal processes for parentage verification and/or parentage discovery



GenoEx-PSE via Interbull Centre

- Exchange of SNP genotypes for parentage verification and/or discovery
- Requires accreditation as a DNA Data Interpretation Centre



Key Activities & Deliverables



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- Annually, the DNA WG evaluates applications received from labs for ICAR accreditation as a genotyping lab
 - Requires ranking results from most recent ISAG Ring Test
 - Proof of ISO accreditation or equivalent with appropriate scopes
 - Moving to minimum of ISO 17025 for both SNP-based (2020) and STR-based (2022) genotyping, with ISO 9001 no longer being acceptable
 - In the near future, the current process for genotyping labs will no longer lead to accreditation for SNP-based parentage verification
 - Direct such labs to the ICAR Accreditation for DNA Data Interpretation Centres
 - Still acceptable process for STR-based parentage verification



Key Activities & Deliverables



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- Finalized the Terms of Reference document for DNA WG
- Complete review and update of ICAR Guidelines
 - Section 4: Guidelines for DNA Technology
- Updated previous ***“Guidelines to laboratories to grant the accreditation for SNPs and STRs based parentage testing in cattle”***
 - International Society for Animal Genetics (ISAG) has provided a forum for labs to participate in an international comparison (“Ring Test”) of ability to extract DNA from sample and accurately carry out SNP- and/or STR-based genotyping
 - ISAG also recommended a group of 100 core SNP plus 100 additional SNP to use for parentage verification and established some “confirmation” rules



Key Activities & Deliverables



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SNP-Based Parentage Verification Accreditation



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- DNA WG prepared various documents associated with this new service launched in Nov. 2017
- All are posted on ICAR web site

ABOUT US ▾

TECHNICAL BODIES ▾

CERTIFICATIONS ▾

PUBLICATIONS ▾

Instructions, procedures and application form for the submission

The following documents provide further detailed information on the ICAR Accreditation process for DNA Data Interpretation Centres:

1. [Standard Operating Procedure for the submission for the ICAR accreditation of as DNA Data Interpretation Centres](#)
2. [Application form for ICAR Accreditation of DNA Centres](#)
3. [Applicant's Guide for the Parentage Analysis Accreditation for DNA Data Interpretation Centres](#)
4. [ICAR Guidelines for Parentage Verification and Parentage Discovery based on SNP](#)
5. [Distribution of SNP by Chromosome Approved by ICAR for Parentage Verification and Exchange in GenoEx-PSE](#)
6. [List of SNP Approved by ICAR for Parentage Verification and Exchange in GenoEx-PSE](#)



SNP-Based Parentage Verification Accreditation



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- The underlying basis for this accreditation is that applicant must demonstrate that they have the expertise and ability to apply the ICAR guidelines for Parentage Verification
 - Based on approved set of SNP that are a subset of the 200 SNP recommended by ISAG
- CDN created the “Cuckoo” software to create the needed data files to send to each applicant for processing
 - Tests 20+ cases associated with Parentage Verification
- Interbull Centre works with applicant and communicates final outcome (pass/fail) to ICAR



ACCREDITED DNA DATA
INTERPRETATION CENTRE
for Parentage Verification by SNP



SNP-Based Parentage Verification Accreditation



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- Step 1.** Application form and €300 payment to ICAR
 - Step 2.** Test files (from Cuckoo software) and instructions sent from Interbull Centre
 - Step 3.** Test results must be completed within 90 days
 - Step 4.** Confirmation of receipt from Interbull Centre and any required follow up
 - Step 5A. 'PASS'** ICAR Accreditation Number, listed on “Accredited DNA Data Interpretation Centres”, Certificate delivered, renewal date set every 2 years
 - Step 5B. 'FAIL'** Organization may re-apply with new payment



SNP-Based Parentage Verification Accreditation



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- Currently, 20 organizations (15 countries) have been accredited:
 - Austria (**ZuchtData**)
 - Canada (**CDN**)
 - Denmark (**SEGES**)
 - Finland (**Faba**)
 - Germany (**VIT, GAU**)
 - Ireland (**ICBF, Weatherbys**)
 - Italy (**ANAFI, ANAPRI, ANARB**)
 - Japan (**LIA**)
 - Netherlands (**CRV**)
 - Norway (**GENO**)
 - Poland (**NRIAP**)
 - Slovenia (**AIS, Univ. of Ljubljana**)
 - Sweden (**Växa**)
 - Switzerland (**QUALITAS**)
 - United States (**CDCB**)
- More organizations are expected to apply for accreditation following the ICAR meetings earlier this week
- Accredited organizations qualify to be a GenoEx-PSE Service User



Parentage Discovery



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- GenoEx-PSE currently has 9 Service Users
 - Only for Parentage Verification
 - Can only submit 200 SNP per “target” animal
 - Given their longer term interest in also doing Parentage Discovery, several have inquired about the timing of expansion
 - Would prefer to be able to upload all 554 SNP for Parentage Discovery now to avoid needing to upload same animals again later on
 - Therefore DNA WG has high priority on:
 - Establishing the guidelines for conducting Parentage Discovery
 - Specify those “cases” that need to be tested by the applicant
 - Expand the Cuckoo software (contracted resource needed)



DNA WG Priorities



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- Update the ICAR accreditation policies for parentage testing laboratories by imposing ISO 17025 certification by 2022 for STR-based testing
 - Assess the requirements for expansion of services using the GenoEx platform, especially the exchange of full genotypes
 - Expand the Cuckoo software to test for accuracy of processes for parentage discovery
 - Finalize procedures for an ICAR accreditation service to DNA Data Interpretation Centres for SNP-based parentage discovery using 554 SNP
 - Modify ICAR Guidelines to include quality assurance guidelines, both basic and advanced, for organizations processing SNP genotypes

A man in a plaid shirt stands in the foreground, looking towards a large, modern dairy barn in the background. The barn has a long, low profile with a brown roof and several skylights. The scene is set at dusk, with a soft, hazy sky. The barn's interior is visible through large glass doors, showing some equipment. The foreground is a grassy area with some water reflecting the sky.

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CANADIAN NETWORK FOR DAIRY EXCELLENCE



**National Genetics
Research Leader**