



THE GLOBAL STANDARD
FOR LIVESTOCK DATA



ICAR Parentage Analysis Accreditation for DNA Data Interpretation Centres

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Background

- ICAR Board approved the introduction of two new services:
 - **GenoEx-PSE** to facilitate international genotype exchange for parentage analysis
 - **Accreditation of DNA Data Interpretation Centres** wishing to offer parentage analysis services
 - Differs from the accreditation of labs conducting DNA analysis using microsatellite- and/or SNP-based tests
- Both were officially announced at the ICAR annual meeting held in Chile in October 2016 but neither have yet been officially implemented

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GenoEx-PSE Service User Obligations

- Must follow ICAR accreditation rules and regulations
 - Initially pass the process for ICAR Accreditation of DNA Data Interpretation Centres
 - Maintain the appropriate accreditation status which is currently set as a bi-annual renewal

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ICAR Accreditation Process

- Applicant must complete the appropriate forms and submit with payment of 300 Euro to ICAR
 - Indicate Parent Verification or PV & Parentage Discovery
- Service ICAR will review application details and forward to Interbull Centre
- ITBC to send Parentage Analysis data files to applicant
- Applicant runs Parent Analysis software on test files and submits results back to ITBC
- ITBC recommends “Pass” or “Fail” status to Service ICAR
- If “Fail”, then must re-apply

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ICAR Parentage Analysis Guidelines

- For any accreditation service, clear guidelines are required in order to identify “Pass”/”Fail”
- New ICAR DNA Working Group recently developed recommended “***ICAR Guidelines for Parentage Verification and Parentage Discovery Based on SNP Genotypes***”
 - Revised ISAG 2012 guidelines for Verification but require use of all 200 SNP not just “Core 100 SNP”
 - No international guidelines existed for Discovery
- Consulted ISAG for feedback and support
- Approved by ICAR Board in June 2017

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ICAR Parentage Analysis Guidelines

- Guidelines for Parentage Verification:
 - Start with 200 SNP recommended by ISAG
 - As a single group not in two sets of “Core 100” vs “Added”
 - DNA WG identified 4 “problematic” SNP to be excluded by all applicants for ICAR accreditation
 - Animal and recorded parent must both have a genotype with at least 95% of included SNP called
 - 95% of (200-4) = minimum of 186 SNP called
 - Defined rules based on number of conflicts:
 - 0 - 2 conflicts => Parentage Accepted
 - 3 - 5 conflicts => Parentage Doubtful
 - >5 conflicts => Parentage Excluded
 - After verify each recorded parent, must also verify the mating combination and rules are defined

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ICAR Accreditation Testing

- Files formats to be used for accreditation testing are consistent with Interbull formats for GenoEx-PSE (genotypes) and pedigree
- CDN developed software to generate the required files for applicant to test internal processes/algorithm for parentage verification
 - Starts with actual genotypes for “ancestor” animals
 - Creates genotypes for progeny data set to be used for parentage verification ($N \approx 4000$)
 - Progeny genotypes have deliberate SNP conflicts introduced randomly to cover most cases to test
 - Applicant should get 100% correct results when new ICAR guidelines are exactly followed

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ICAR Accreditation Testing

- Accreditation data files generated by the new software (Cuckoo) developed by CDN have been shared with “expert” group for testing
 - All seems to be working well but agreed to test two more scenarios for parentage verification
- CDN now developing similar software for Parentage Discovery, which is more complex
- ICAR Board and Interbull Steering Committee will discuss launch of ICAR Accreditation of DNA Data Interpretation Centres
 - Initially for Parentage Verification only
 - Successful applicants qualify for GenoEx-PSE

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Expected Timelines

- DNA WG and ICAR Board are getting close to define the start date for ICAR Accreditation
 - Before end of 2017 seems very reasonable
 - Some applications have already been received by ICAR and are “on hold” for now
 - Interbull Steering Committee will have to define how the Interbull Centre offers the technical support for the ICAR accreditation process
- GenoEx-PSE software and interface is now at the stage of testing
 - Official launch date will depend on how much more work is required following this testing
 - Early 2018 is a likely realistic objective (PV only)

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Thank You!