Echidna
Mixed Model Software

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Outline

- What is Echidna?
- Why now?
- Relationship to ASReml?
- VSN?
- Access
- Acknowledgements

What it Echidna?

- A fortran program
    written to fit linear mixed models
- Similar to ASReml in functionality
- Not intended to supplant ASReml
  but as a platform to extend ASReml
- Developed and distributed privately without warranty and free of charge.

Why now?

- ASReml was written in 1996 by Arthur Gilmour,
  a biometrician with NSW DPI,
  with strong input from Robin Thompson and Brian Cullis
  to fit linear mixed models in agricultural research, with particular
  emphasis on models used for plant and animal breeding.

- The core was implemented in an R package by Dave Butler
  and in Genstat by Sue Welham.

- The key developers have continued to support ASReml.

- VSN purchased the rights in 2012,
  this changed the development dynamic.

Why now?

- ASReml was very efficient for sparse mixed models such as pedigree based genetic analysis
- But not so good for genomic based models which are not sparse.
- The many features added to ASReml over the decades have resulted in code that is not well organised.
- ASReml is lagging in development under the present management model.
- Writing a new program from scratch will allow better methods for genomic models and better general organization.
- Independence from VSN will allow more researchers to contribute to development.

Relationship to VSN

- VSN purchased ASReml from NSW DPI in 2012
- They contracted ARG to support ASReml users in 2013.
- They wish to own Echidna as well since it has much the same functionality, and they claim all the know how belongs to them.
- ARG has not accepted the terms they have offered because they preclude open scientific collaboration; he cannot do what is required by himself.

Relationship to ASReml

- Echidna will directly read many ASReml command files
- Expect to achieve 80% of ASReml functionality
- Output files have been simplified
- If it proves successful, it could become the basis for ASReml 5.

Access

- Available for free from EchidnaMMS.org
    for NON-COMMERCIAL use
    unless you have an ASReml license
- I acknowledge the principle that commercial users should contribute to maintenance and development costs
- but students and researchers should have free access.

Support

- Echidna is free of charge but comes without formal support.
- Every effort will be made to resolve reported bugs quickly.
- Users may contract the developers to provide training and/or statistical support at negotiated hourly rates.
- User resources will be made available through the website.

Stage of development

- Echidna currently runs a diverse range of ASReml models
- Major ASReml functionality not yet implemented includes
  prediction, tabulation, factor models, kriging models, GLMM and
  F-tests.
  I expect these all to be implemented in 2018.
- It is now ready for experimental use.
- Intially I expect users to report many issues as it has only been tested
  on a few jobs.
- Early adopters should update the software every month or so.

Development philosophy

- No warranty: commercial users should use ASReml
- I rely on users to report bugs and suspicious results
- I rely on users to suggest new facilities
- New facilities will be offered to VSN for inclusion in ASReml.

Partners

- I expect others will partner to provide an R product based on Echidna.
- VSN ???
- Research students into mixed models to explore new approaches?
- Student reports on particular analyses exploring model options and interpretations?

Acknowledgements

- ASReml as a product belongs to VSN but all ideas implemented in it are I believe in the literature (or should be).
- The written paper names many people who have patiently explained linear mixed models to me over decades. I thank them for doing that. They deserve credit for their contribution to ASReml, and now Echidna.
- I thank Jesus Christ for allowing me to develop ASReml and Echidna to facilitate study of the wonders of the biological systems He has created.
- Contact me at arthur.gilmour@cargovale.com.au or support@EchidnaMMS.org.

The Echidna

- The Australian marsupial spiney ant eater