

MiXBLUP

EADGENE – SABRE

Industry Days

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ANIMAL SCIENCES GROUP
WAGENINGENUR

Animal Breeding &
Genomics Centre

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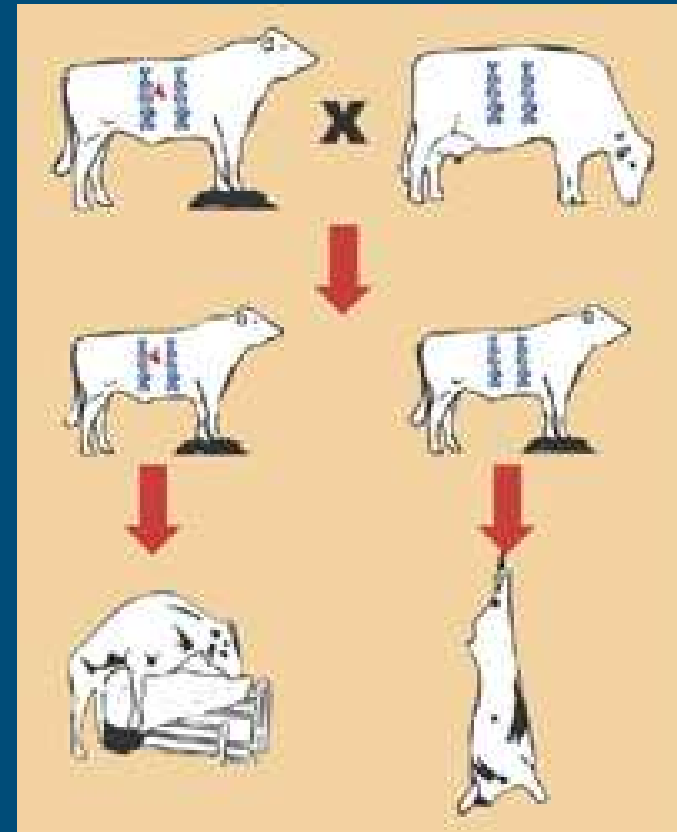
Introduction MiXBLUP

Breeding value estimation

$$P = G + E$$

$$y_{i,j} = \mu + \text{fixed} + \text{ebv} + \text{random} + e$$

Maximize accuracy =
 $r(\text{ebv}, G)$



Introduction MiXBLUP

- More and more genotypic information
 - E.g. SNP, microsatellites
- Combining of genotypic and phenotypic data in breeding value estimation
 - Increased accuracy and higher genetic gain
- No software for routine genetic evaluation to combine both sources of information



Introduction MiXBLUP



- Most software is home made stuff
- Lot of software made by scientists for scientific research
- Interface user-friendly



What is MiXBLUP - Context project

- Project is part of SABRE WP1 – Numerical Genomics
 - Deliverable: software for breeding package available for a selected group of partners for testing
- Proposal for gene/marker-assisted selection



What is MiXBLUP - Objective SABRE

- To develop methods to combine information of known genes/QTL and phenotypic information in breeding value estimation
- To incorporate these methods into software for routine genetic evaluation of livestock.



What is MiXBLUP - partners

Objective industry partners:

Find appropriate existing breeding value estimation software

1. Inventarisation of existing breeding value estimation software
2. Decided to use MiX99

Financed by

- SABRE (EU)
- HG
- CRV
- IPG



What is MiXBLUP - project

- Easy BLUP program
- Flexible user interface
- Data parsing

MiXBLuP
parser



What is MiXBLUP - Software development

- MiX99 – Finnish software package for routine breeding value estimation (Lidauer and Strandén, 1999)
- We have developed in collaboration with MTT a parser that makes MiX99 more user-friendly
 - Input file looks similar to ASREML
 - Parser + MiX99 = MIXBLUP
- First version of MIXBLUP delivered in October 2007 to industry partners CRV, IPG and Hendrix Genetics



Introduction new software: MiXBLUP

- Dairy and beef calving traits
 - Animal model
 - Maternal effects for calving ease ,gestation length and stillbirth
 - Correlations between traits

- Beef production traits
 - Animal model
 - 15 traits
 - Maternal effect for weaning weight in one model



Introduction new software: MiXBLUP

- Animal model with direct and maternal effect
- Combined analysis: Little 'hand work'
- Reliabilities are calculated



Why MiXBLUP - Quicker

■ Calving ease evaluations:

	EBVs	rel
• Asreml:	4 to 5 days	-
• MIX99 :	2 hours	25 min

■ Beef evaluations

	EBVs	rel
• PEST	2 days	3 days
• MIX99	5 hours	1 hour



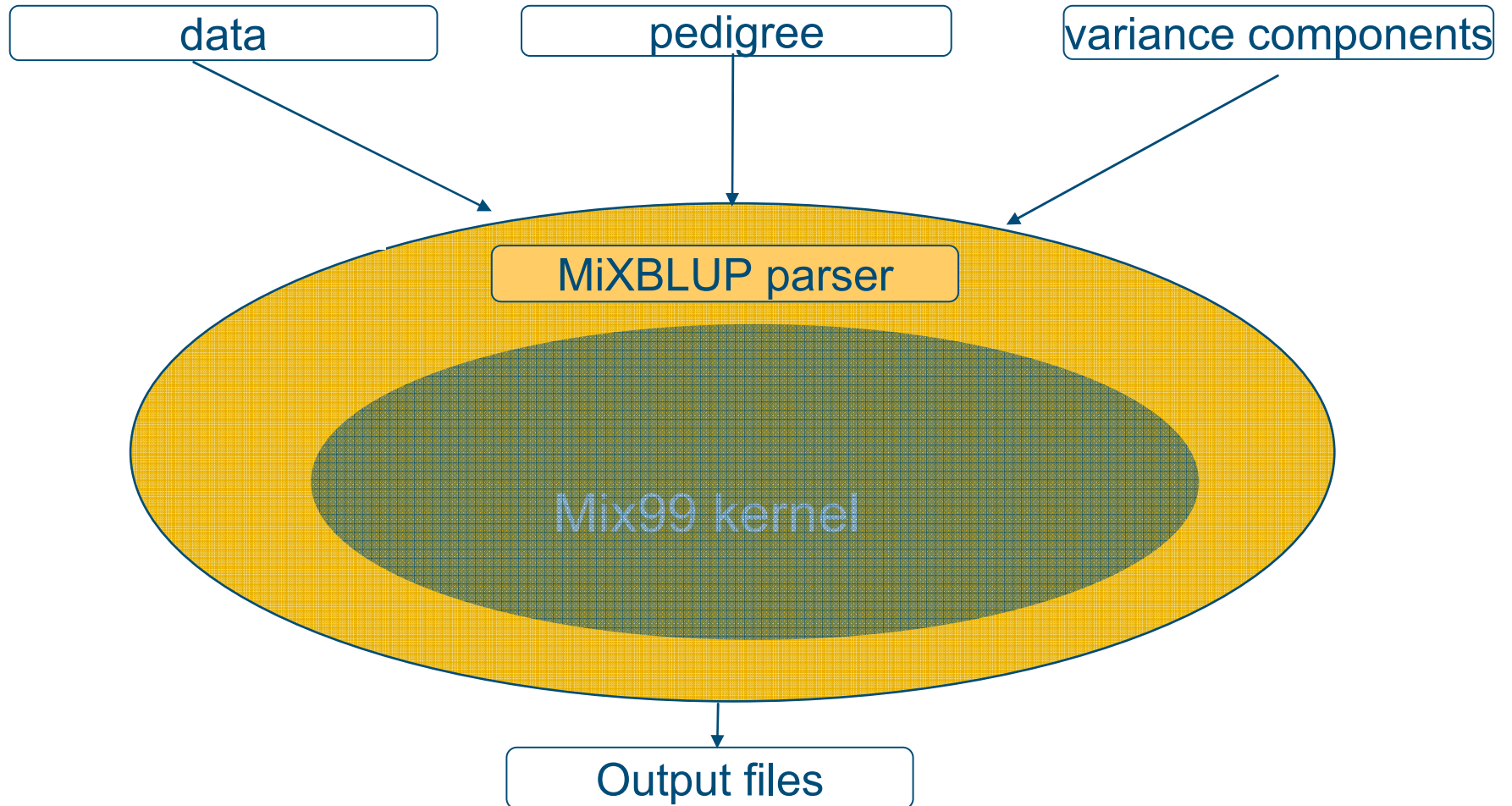
Why MiXBLUP - parser

■ New functions

- Reading input (parameters & data)
- Asreml like parameter file
 - Functions
 - Model definition
- Data coding
- Alphanumeric



What is MiXBLUP?



Why MiXBLUP?

IPG: 25 traits, many different random effects, e.g. with cross-fostering

ASG: IBD-matrix for haplotype effects, random regression on SNP/haplotypes

ICBF: maternal genetic, maternal environment effects, foreign EBV, 18 traits, reliabilities

HG: Large laying hen evaluation



Why MiXBLUP

- Data file/pedigree file can contain numeric as well as alpha numeric data (e.g. animal ID)
- no limit on number of traits
- no limit on number of effects
- many genetics models supported: sire & animal models
- large data sets
- QTL-effects taking in account, also possible with IBD-matrix (Identity by Descent)
- Use of genomic relationship matrix for genomic selection
- maternal genetic effects
- group selection
- reliabilities
- random regression
- Preconditioned Conjugate Gradient Method algorithm (very fast algorithm, substantial reduction in time)



MiXBLUP

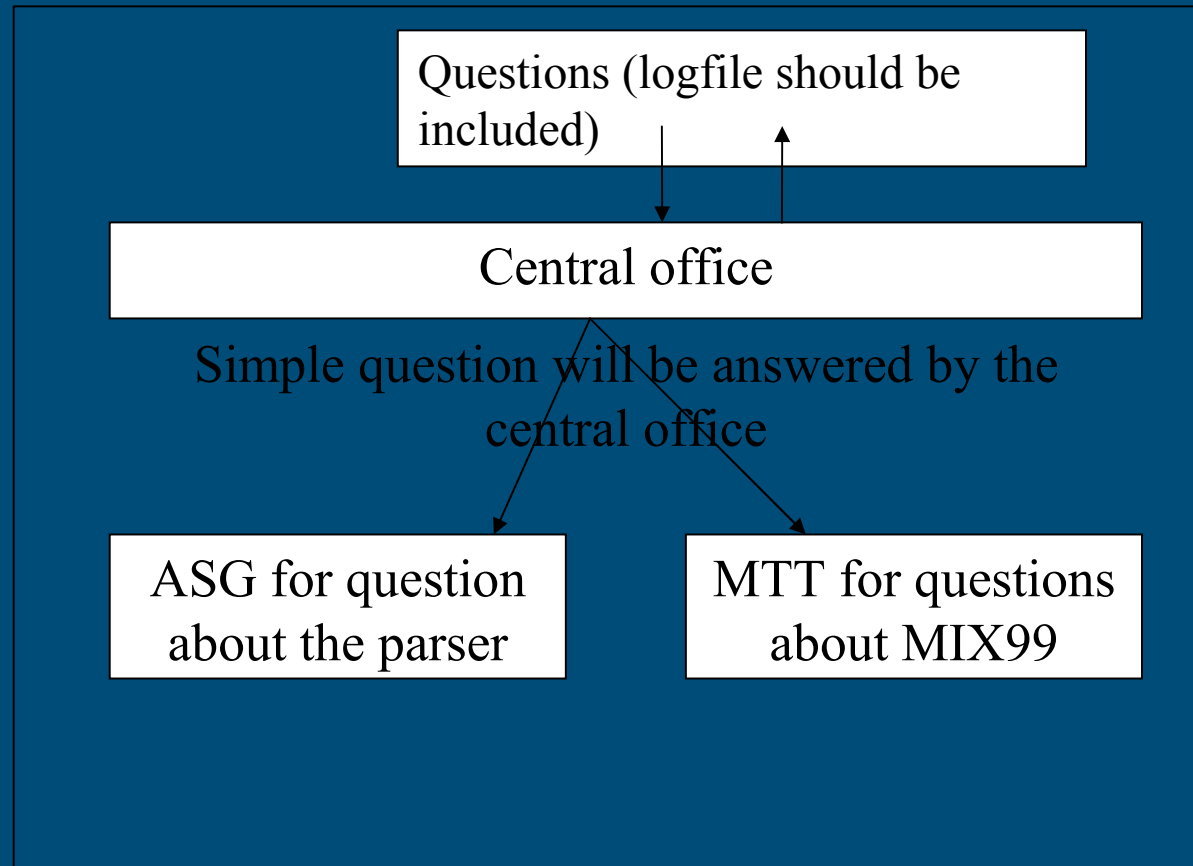
Planning: MiXBLUP

available at the end of the year:

- Software
- Workshops



Service MiXBLUP



Service MiXBLUP

- Basic support *of max 1/2 day*: included in software.
- User support: 2 days service per year
- Development support: on demand



Service MiXBLUP

Target group	Product	Version	Number of computers per license	
			1	> 1 and < 10
Large breeding companies	MixBLUP	Unlimited	€4.900,-	€9.800,-
Small breeding companies and universities	MixBLUP	<1.000.000 equations	€1.900	€ 3800,-
Students and demo	MixBLUP	< 1.000 equations	Free	Free



Marketing MiXBLUP

Thank you for your attention!

Visit

www.mixblup.eu



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