IT-Solutions for
Animal Production

INTERBEEF R & D PROJECT

"Int. Evaluation for fertility traits"

- Summary of survey

- Conclusion

F. Reinhardt*, J. Dürr**

*) GE Unit, Vereinigte Informationssysteme Tierhaltung w.V. (**vit**), Verden

**) IB Center, Uppsala

Interbeef survey : GE for fertility traits in beef cattle

- National GE – systems in place (traits, breeds)
  - male fertility
  - female fertility
  - models
- Preferences for international GE
  - male / female fertility
  - traits, breeds
- Questions put together by F. Reinhardt and J. Dürr
- 9 countries replied (january / february, 2014)
  - 5 evaluation centers
  - 4 others (breeding organizations)
- The technical support of IB center is greatly appreciated !

Interbeef survey : GE for fertility traits in beef cattle

Countries responding

- CHE
- CZE
- DEU
- DNK
- FIN
- FRA
- GBR
- IRL
- SWE

National GE systems for fertility traits in beef cattle

Breeds / # countries with GE:

▪ Limousin, Blonde d'Aquitaine, Salers	5
▪ Charolais	4
▪ Angus, Hereford, Highland, Simmental	3
▪ Aubrac, Belgian Blue, Galloway, Parthenaise, Piemont, Rouge de Pres	2

National GE systems for fertility traits in beef cattle

Male fertility traits

- Recording of male fertility traits in 4 countries
- GE of male fertility traits currently in 2 countries

- Traits (recorded / evaluated)

% cycling femals pregnant	1 / 0	(FIN)	
age at puberty	0 / 0		
scrotal circumference	3 / 1	(IRL, GBR, SWE)	h^2=0.33
semen quality	1 / 0	(SWE)	
testosterone concentration	0 / 0		
Others (calving rate)	1 / 1	(IRL)	h^2=0.01

National GE systems for fertility traits in beef cattle

Female fertility traits

- Recording of female fertility traits in 9 (all) countries
- GE for female fertility traits currently in 5 countries (IRL,GBR,DNK,DEU,FRA)
- Traits (recorded / evaluated)

age at 1st calving	7 / 3 (IRL,GBR,CZE,FIN,CHE,SWE,DEU)
age at puberty	0 / 0
calving date	5 / 0 (IRL,CZE,FIN,CHE,SWE) ??
calving interval	8 / 4 (IRL,GBR,CZE, DNK,FIN,CHE,SWE,DEU)
calving rate	2 / 1 (IRL,SWE)
calving success	3 / 0 (IRL,FIN,SWE)
days to calving ?	2 / 0 (FIN,CHE)
1st service conception rate	1 / 1 (FRA)
number of calves (78 mon./FRA)	7 / 2 (IRL,CZE,FIN,CHE,SWE,DEU,FRA)
post partum re-conception interval	0 / 0
pregnancy rate	1 / 0 (IRL)
others (life span, gestation length)	1 / 0 (CZE ?)
others (cow survival)	1 / 1 (IRL)

National GE systems for fertility traits in beef cattle

Female fertility traits

Heritabilities used for national GE

age at 1st calving (CA1)	0.20
calving interval (CI)	0.025 – 0.09
calving rate (CR)	0.06
1st service conception rate (HCS/PCS)	0.015
number of calves (NC)	0.15
number of calves 78 mon. (NC78)	0.04
cow survival (CS)	0.02
life span (LS = CS?)	0.11
gestation lenght (GL)	0.20

National GE systems for fertility traits in beef cattle

Female fertility traits

Models used for GE (not complete)

- IRL: Linear MT-R-A – Model (CA1, CI, CS)
- DEU: Linear MT-R-A – Model (CA1, CI) // Survival Kit (NC)
- FRA: Linear MT-A Modell (HCS/PCS) // Linear A-Model (NC78)

- Summary: enviromental effects, individual non genetic effects
  - Random: contemporary group: (herd x year)
  - Fixed: calving season, (parity x age), sex of calf

National GE systems for fertility traits in beef cattle

Female fertility traits

Publication rules

- IRL, GBR: All animals with reliabilities
- DNK: All animals > 10% Rel.
- DEU: Males > 30% Rel. // Females ≥ 2 calvings
- FRA: Only Males > 35/30 daughters and > 30% Rel.

International GE: Breeds nominated

Breed	#	Countries	Priority
Angus	5	(IRL,DNK,FIN,CHE,SWE)	3
Blonde d'Aquitaine	5	(DNK,FIN,CHE,SWE,FRA)	2
Charolais	8	(IRL,GBR,DNK,FIN,CHE,SWE,DEU,FRA)	1
Dexter	1	(DNK)	
Galloway	1	(DNK)	
Hereford	5	(IRL,DNK,FIN,CHE,SWE)	3
Highland Cattle	2	(DNK,FIN)	
Limousin	8	(IRL,GBR,DNK,FIN,CHE,SWE,DEU,FRA)	1
Simmental (Beef)	7	(IRL,GBR,DNKFIN,CHE,SWE,DEU)	2

International GE: Traits proposed

Trait	#	Countries	Priority
Cycl. females impreg.	2	(FIN,SWE)	
Age at 1st calving	5	(IRL,GBR,FIN,SWE,DEU)	2
Calving interval 8	(IRL,GBR,DNK,FIN,CHE,SWE,DEU,FRA) 1		
Calving rate	1	(IRL)	
Calving success1	(FIN)		
1st serv. conc. rate	2	(CHE,FRA)	
Post p. re-conc. rate	1	(CHE)	
# of calves	4	(CHE,SWE,DEU,FRA)	3
Cow survival	1	(IRL)	

Final comments

- IRL: Harmonization of traits necessary
- SWE: National evaluation in the first step
- DEU: Focus on max. 3 breeds and 3 traits

Conclusions for an international GE for fertility traits

Male fertility traits: Interbeef evaluation currently not required

Female fertility/reproduction traits: Yes, demand in many countries

1. Priority of traits
    1. Calving interval should be available in all countries !?
    2. Age at first calving should be aailable in all countries !?
    3. Number of calves (= ~ cow survival / longevity / life span)

2. Priority of breeds
    1. Charolais, Limousin
        - close relationships via FRA, # of records, pedigree data already in IDEA
    2. Simmental, Blonde d'Aquitaine
        - Simmental (as an example without FRA)
        - Blonde d'Aquitaine (close relationships via FRA, # of records)
    3. Angus, Hereford
        - Examples without FRA

Model considerations

- Focus on female fertility

- Fall back on traits derived from reliable dates (birth date, calving dates)
  - Calving intervall (CI)
  - Age at 1st calving (CA1)
  - Number of calvings (NC), instead of cow survival/longevity or life span

- Simple/robust models within breed
  - Multi trait repeatability animal model

    CI = (herd x year) + (parity x age) + sex(calf) + a + p + e (rep. rec.)

    CA1 = (herd x year) + a + e

  - Survival Kit (S-MGS-Model, censored data)

    CN = (herd x year) + sire + e

Next steps (to be discussed)

- Agreement about traits
- Definition of contents and formats of INTERBEEF reproduction file
- Data call by INTERBEEF
- Development of GE system by vit
  - Plausibility checks (must be defined, harmonized over all countries/breeds)
  - Data preparation (pedigree data, reproduction data)
  - Adaptation of evaluation programs
  - Calculation of reliabilities
  - Preparation of EBV-Files for paticipating countries
- Validation of results (in cooperation with participating countries)

Thank you

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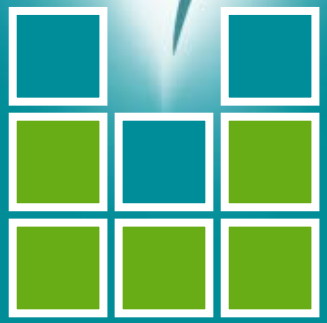

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