Mendelian Sampling Test Review of Country Results

Interbull Workshop

August 25th-26th Dubrovnik, Croatia

✓2012 Test software developed for Interbull service users (Tyrisevä et al, 2012)

✓Nantes 2013 - Ok to proceed with a pilot study

✓ Berlin 2014 – First pilot run results

- ➢ 26% of combinations failed the test

- ➢ Countries investigation revealed faulty data being used

- ➢ Software Adjustments

➢ September 2017: Software applied to all breeds for production traits

➢ January 2018: Software applied to all breeds/all traits

- ➢ Software Adjustments

Mendelian Sampling Test Criteria

- Aim:

Detect heterogeneity in genetic variance

- By:

❖Calculating within-year genetic variances and assessing existence of a trend by a weighted linear regression of within-year variances.

❖ Calculating empirical 95% C.I. for the trend by bootstrapping 1000 samples

❖ Detect years with possible outliers

- *For the trend*:

  ❖ ± 2% avg estimated genetic variance

  ❖ 95% C.I. including zero

- *For the outliers*:

  ❖ 95% C.I. including the average genetic variance

(Tyrisevä et al. 2012, Interbull Bull., 46:97–102)

- MS Test requested from all countries introducing changes or validating for the 2 years' rule (22 in total, any breed/any trait)

➢ MS Test received from 18 (+3) countries for different breeds/traits:

➢ **PROD + UDDER**: test requested for both sexes

➢ **OTHER TRAITS**: test requested for males only

- Software minimum requirements:

  - ✓ MS reliability > 0.1

    Warning! After MS reliability check, number of records under 10 in a year class: 2013
    Please check is it possible to change a time window or exclude the outermost year(s).

  - ✓ Minimum animals/birth year class

    Warning! In each birth year class the number of animals with observations must be at least 50% of the average class size in the testing period.
    An average number of animals per year is: 183.2
    In year 2010 n =   78
    In year 2011 n =   76
    In year 2012 n =   42
    In year 2013 n =   12
    Please check is it possible to change a time window or exclude the outermost year(s).

- Heterosis not accounted for

  - ➢ Test should be applied within breeds

    - ✓ Decrease number of eligible data for some countries

Country	PROD		UDER		CONF	LONG	CALV	FERT	WORK
	M	F	M	F	M	M	M	M	M
BEL	Y	Y	Y	Y	Y	Y		Y	
CHE	Y		Y		Y	Y	Y	Y	Y
DEU	Y	Y	Y	Y	Y	Y	Y	Y	Y
ESP					Y			Y	
HRV	Y		Y						
HUN							Y		
IRL	Y				Y	Y	Y	Y	
ISR			Y	Y		Y	Y		
ITA	Y	Y					NA	Y	
JPN	Y	Y	Y	Y	Y			Y	
KOR	Y	Y	Y	Y	Y				
NLD	Y	Y	Y	Y	Y		Y	Y	Y
PRT	Y		Y		Y				
SVK	Y	Y							
URY	Y	Y	Y	Y				Y	
USA	Y	Y	Y	Y			Y	Y	
ZAF					Y		Y		
GBR	Y	Y	Y	Y			Y	Y	

Overview of Data Received per Breed

SIM

country	PROD		UDER		CONF	LONG	CALV	FERT	WORK
	M	F	M	F	M	M	M	M	M
CHE	Y								
HRV	Y		Y						
HUN			Y	Y					
ITA	Y	Y	Y	Y					
SVN						NA			
GBR	Y	Y	Y	Y		Y			

RDC

country	PROD		UDER		CONF	LONG	CALV	FERT	WORK
	M	F	M	F	M	M	M	M	M
DEU	Y	Y	Y	Y	Y	Y	Y		Y
NOR	Y	Y	Y	Y	Y	Y			Y
USA	Y	Y	Y	Y		Y		Y	
ZAF	Y	Y	Y	Y		Y		Y	
GBR	Y	Y	Y	Y		Y			

BSW

country	PROD		UDER		CONF	LONG	CALV	FERT	WORK
	M	F	M	F	M	M	M	M	M
CHE	Y		Y		Y	Y	Y	Y	Y
DEA					Y				
ITA	Y		Y		Y			Y	Y
USA	Y	Y	Y	Y		Y		Y	
GBR	Y	Y	Y	Y		Y			

JER

country	PROD		UDER		CONF	LONG	CALV	FERT	WORK
	M	F	M	F	M	M	M	M	M
DEU		Y		Y					
USA	Y	Y	Y	Y				Y	Y
GBR	Y	Y	Y	Y				Y	

Overview of Results

	Tot	%
PASSED	285	78
FAILED	75	21
Failed corrected	30	8
NA	5	1
ToT	**365**	**100**

HOL

	PASS	FAIL
MIL	19 (F8,M11))	0
FAT	*20 (F8, (M12)*	*0*
PRO	*21 (F8,M13)*	*0*
SCS	17 (F7,M10)	1(F0,M1)
STA	9	0
USU	7	1
BCS	5	0
LOC	7	0
HCO	4	0
CC1	8	0
CC2	7	1
CRC	7	1
INT	6	4
ToT	137	8

BSW

	PASS	FAIL
MIL	5 (F1,M4)	0
FAT	5 (F1,M4)	0
PRO	5 (F1,M4)	0
SCS	5 (F1,M4)	0
STA	3	0
USU	3	0
HCO	2	0
CC1	2	0
CC2	2	0
CRC	2	0
INT	2	0
ToT	36	0

RDC	PASS	FAIL
MIL	6 (F2,M4)	3 (F2,M1)
FAT	*8 (3,M5)*	*1 (F1,M0)*
PRO	*6(F2,M4)*	*2 (F1;M1)*
SCS	9 (F4,M5)	1(F1,M0)
DLO	4	0
ToT	33	7
JER		
MIL	4 (F2,M2)	0
FAT	*2 (F2,M0)*	*1 (F0, M1)*
PRO	*4 (F2, M2)*	*0*
ToT	*10*	*1*
SIM		
MIL	4 (F1,M3)	*0*
FAT	4 (F1,M3)	*0*
PRO	4 (F1,M3)	*0*
ToT	12	*0*

One Look at the Genetic Trend

- Is there any inference we can make by looking at the genetic trend?

Fat Genetic Trends - HOL
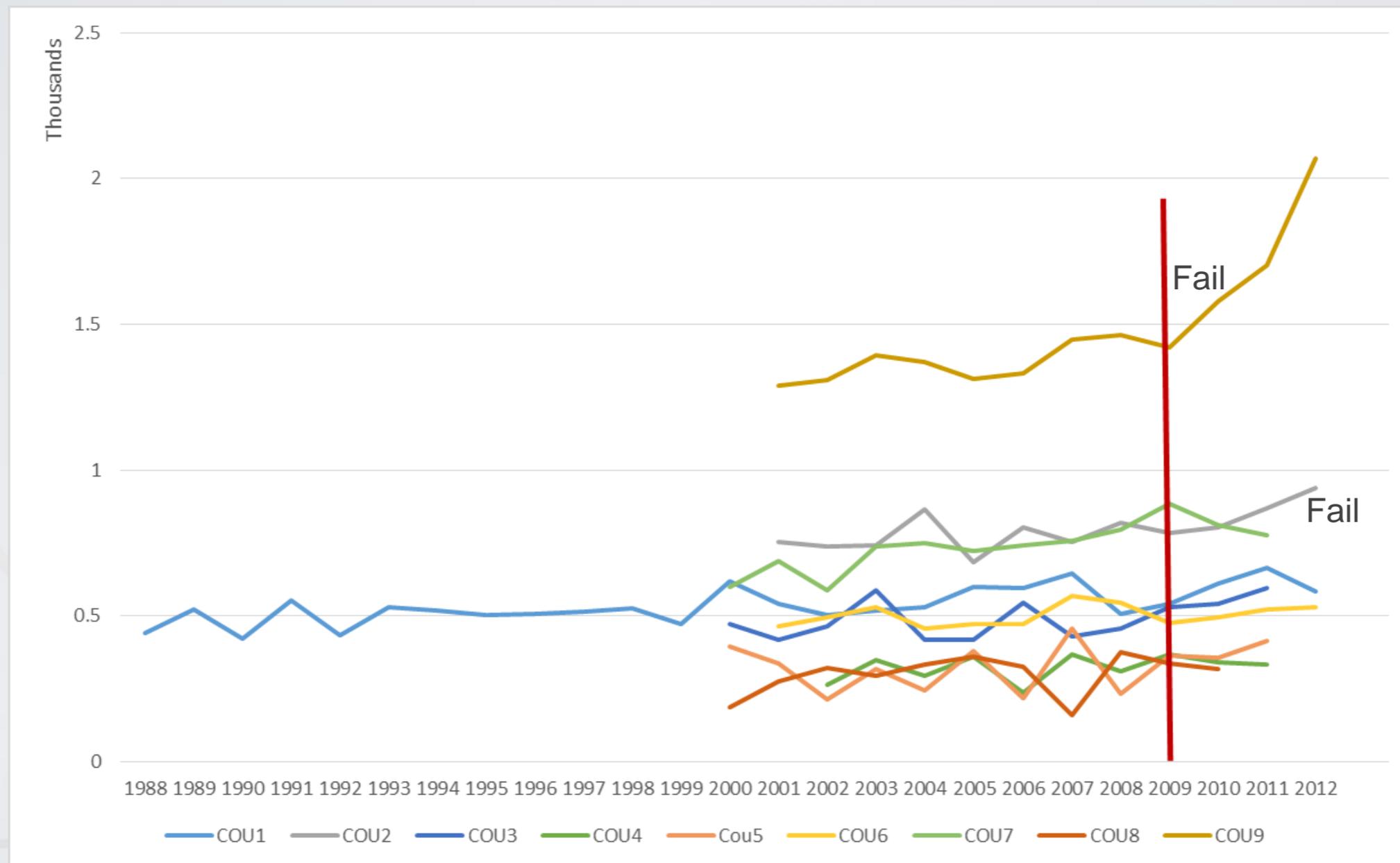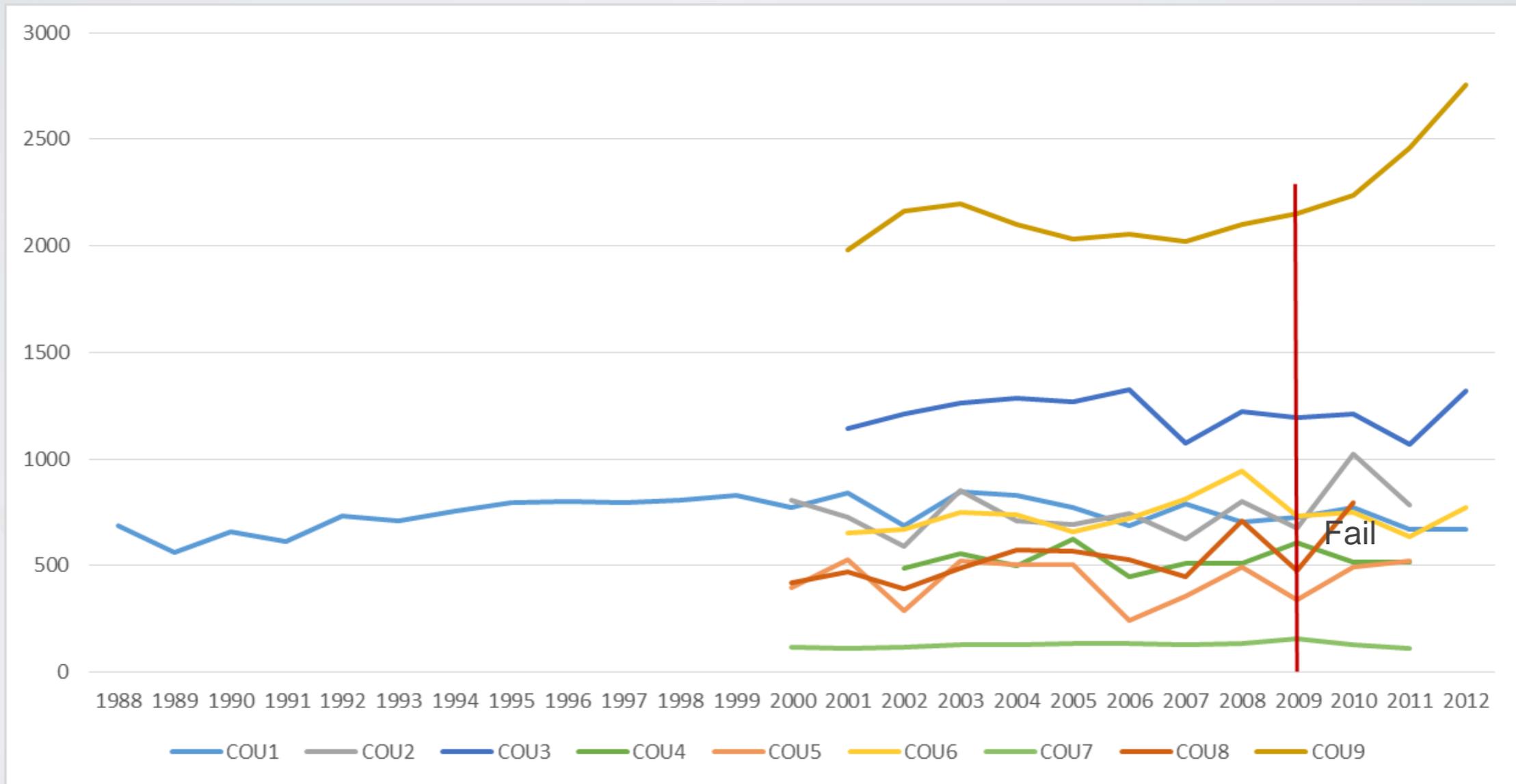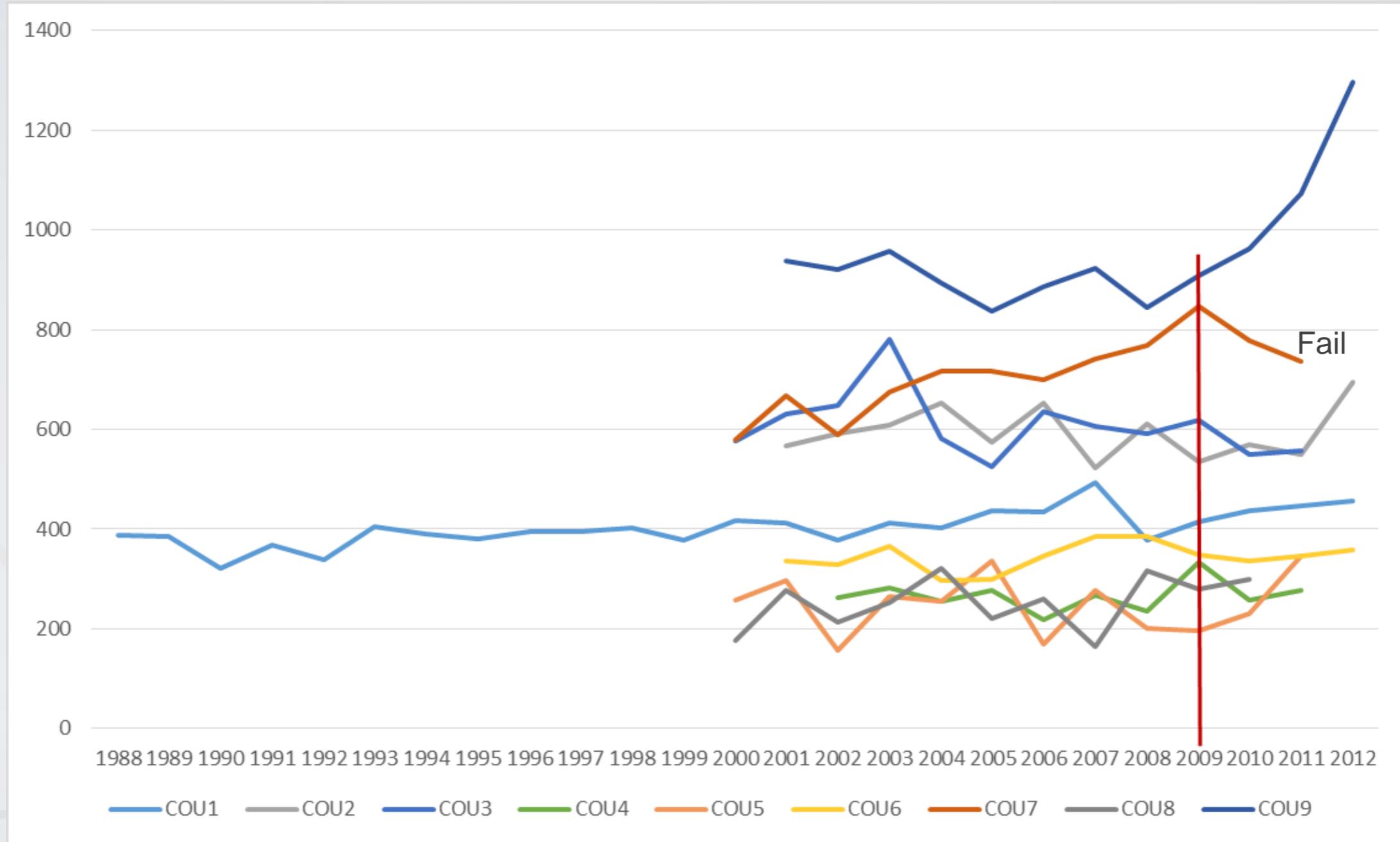
Fertility Interval Traits (CC2) - HOL
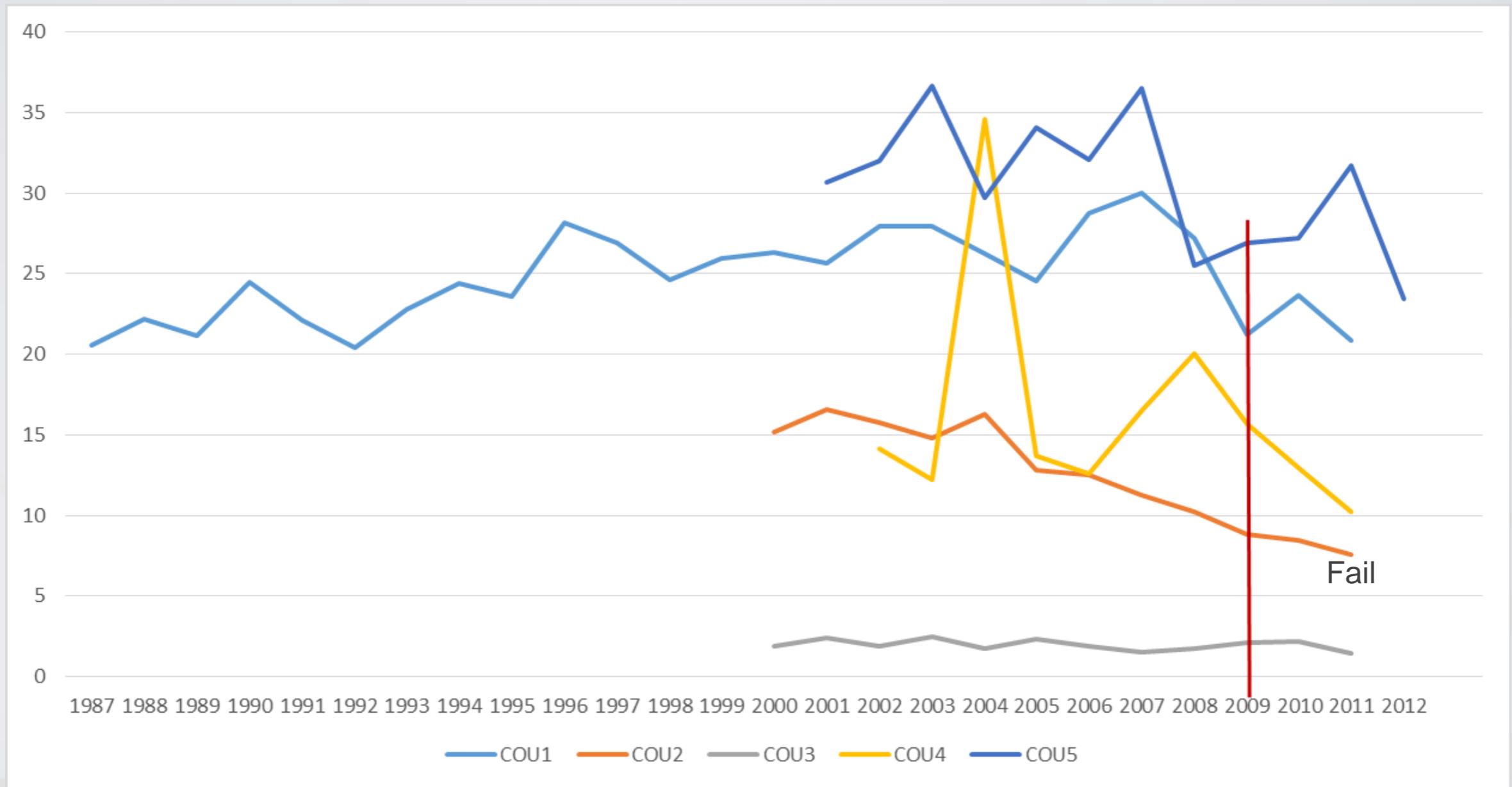
General Conclusions

➢ A total of 360 MS tests received

   ➢ 289 (79%) successfully passed the test

   ➢ 30* (8%) failed the test

   ➢* After discarding of results with:

      ➢ Presence of years' outliers

      ➢ Software's warnings on not enough records for some years' classes

   ➢ Looking forward to hear about countries experiences and ITC final recommendation

Acknowledgements

✓LUKE   ✓ITC   ✓WG   ✓All users!