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CLIMANIMAL PROJECT



EFFECT OF HOMOGENEOUS CLIMATIC ZONES ON FERTILITY TRAITS

IN THE ITALIAN HOLSTEIN CATTLE BREED

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Introduction



- Well-known effect of severe climatic conditions on dairy cow performances
 - ▶ heat stress (Milk production and reproduction will be decreased).
- The environmental conditions that induce heat stress can be calculated using the temperature humidity index (THI).
- THI can be used to evaluate the effect of climatic changes on production and/or reproduction

Objective



The aim of this study was to examine the effect of different weather conditions on reproductive performances in the Italian Holstein cattle population.

Material & Methods



Traits:

direct traits:

- calving interval (CI, days),
- non return rate at 56 d (NR56, %)
- days to first service (DTFS, days)

correlated traits:

- angularity (ANGO, linear score 1-50)

Material & Methods



Data:

- 776435 record
- primiparous Holstein cows calving from 2002 to 2007
- data pre-adjusted for Herd-year-season effect

Material & Methods



Models (GLM, SAS[®]):

*ANGO = age*stage class angebv zone*

*DTFS = yc*mc age class dfsebv zone*

*CI = yc*mc age class ciebv zone*

*NR56 = yi*mi age class nrebv zone*

stage = lactation stage

age = age at calving (insemination)

yc (i) = calving year (c), insemination year (i)

mc(i) = calving month (c), insemination month (i)

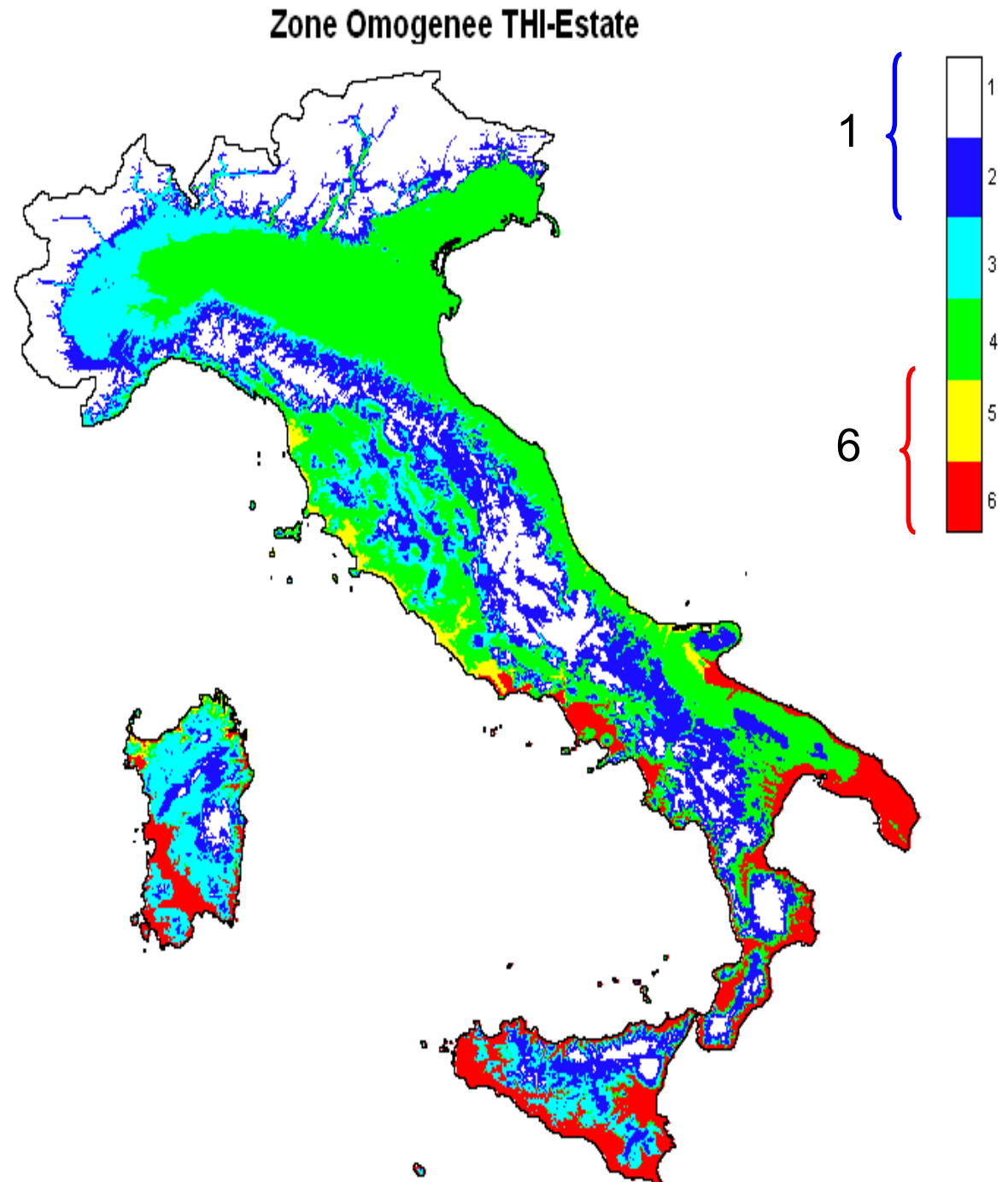
_ebv = EBV of the trait (covariate)

class = production class

zone = climatic zones based on THI values

Climatic Zones

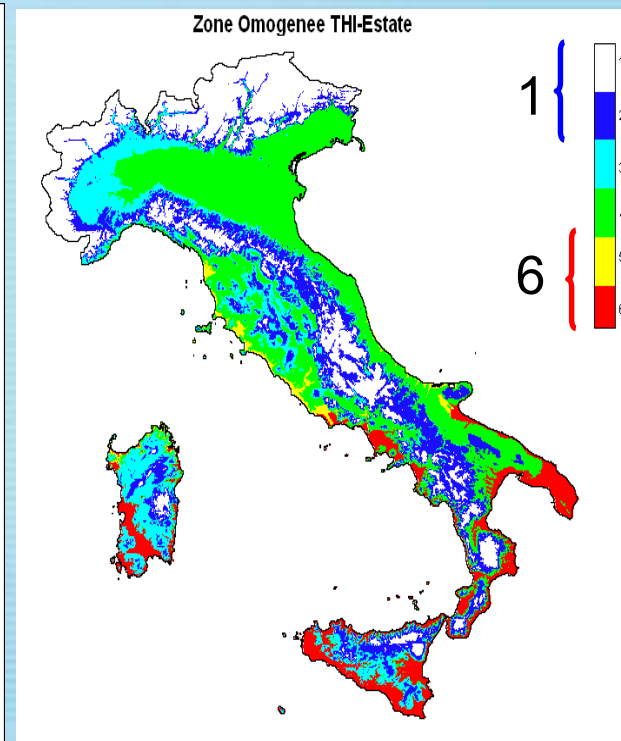
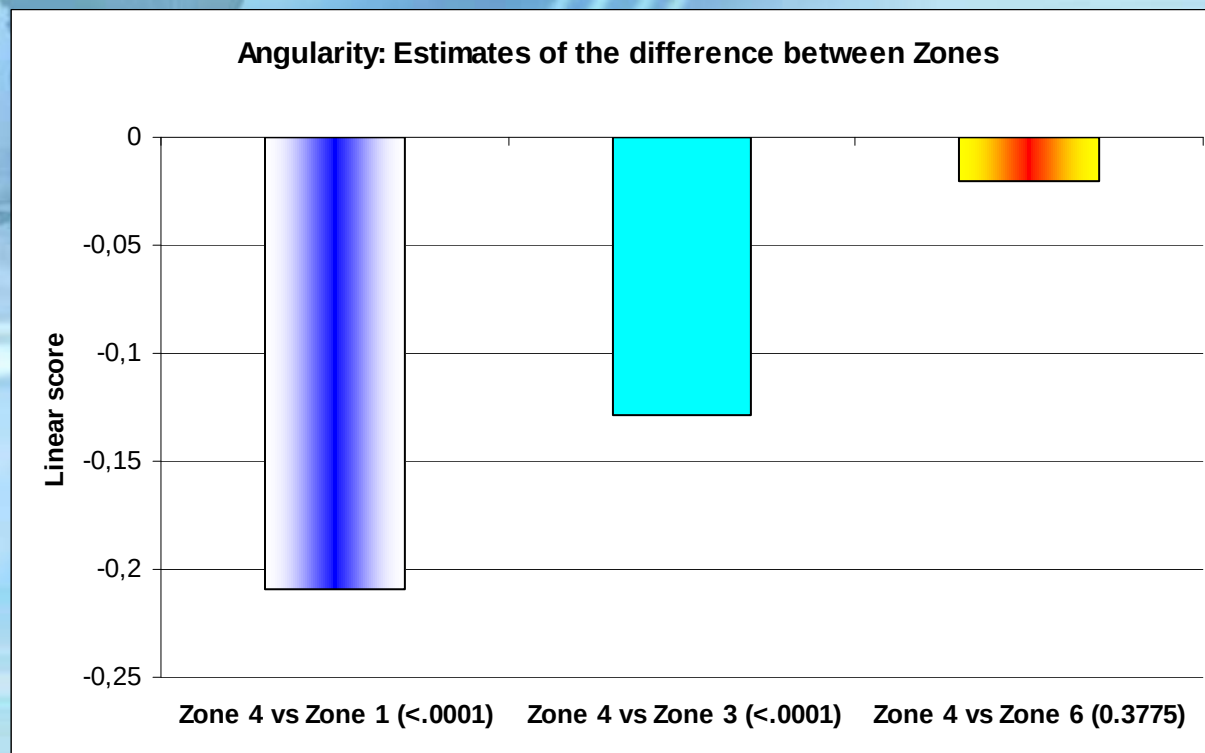
- The Italian Biometeorological Institute identified six homogeneous climatic zones.
- These were defined based on level of Temperature-Humidity Index (THI) in the summer period (June-August) in the last 30 years (cluster analyses)



Results



Are there differences among THI homogenous zones ?

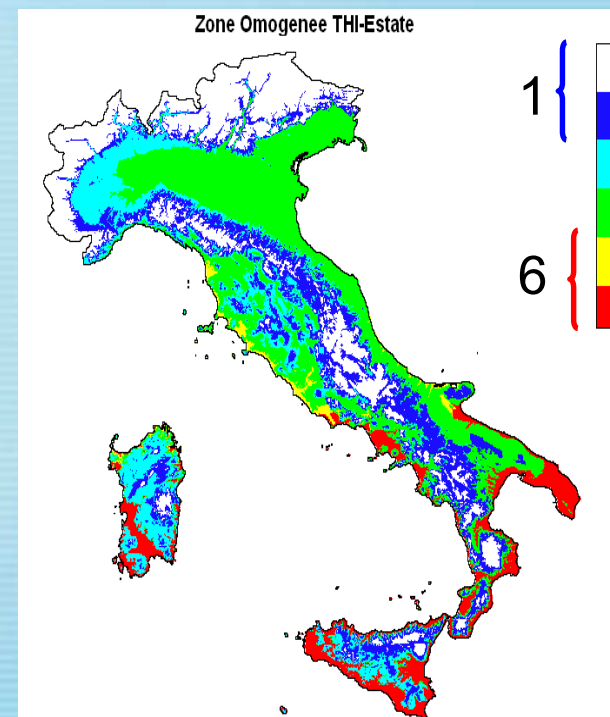
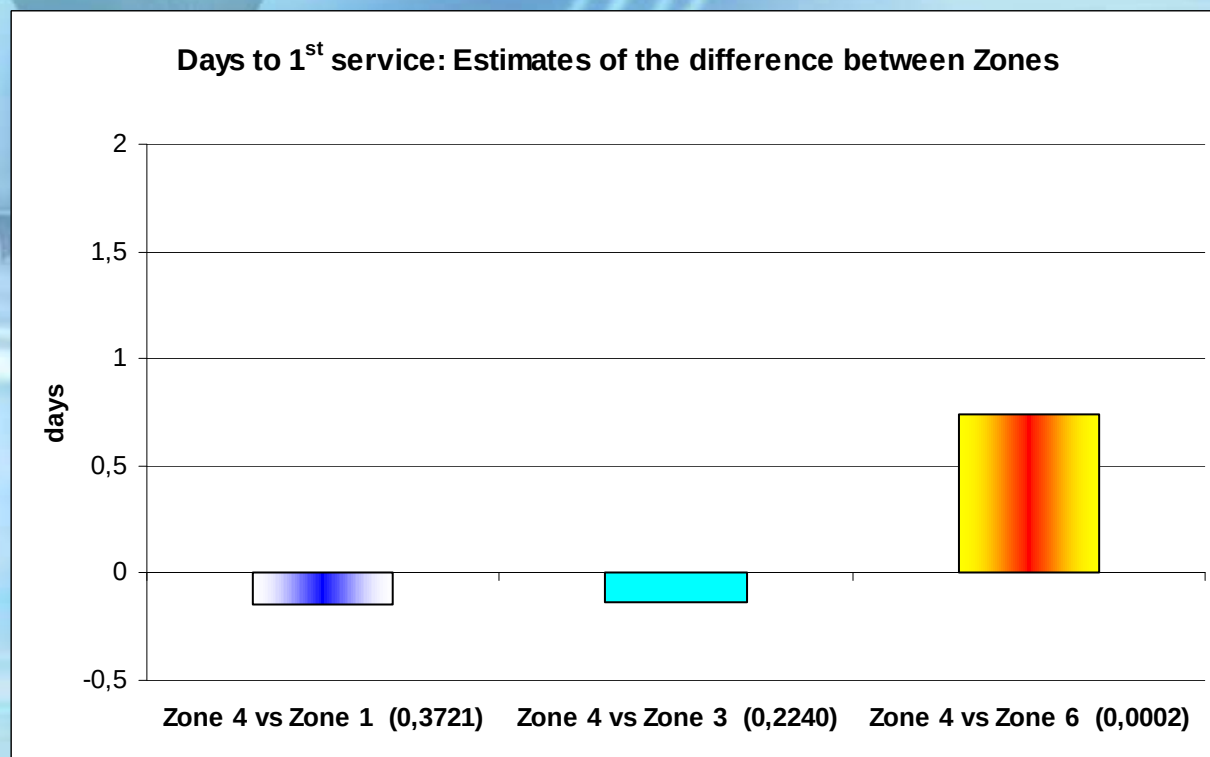


Less angular cows in zone 4

Results



Are there differences among THI homogenous zones ?

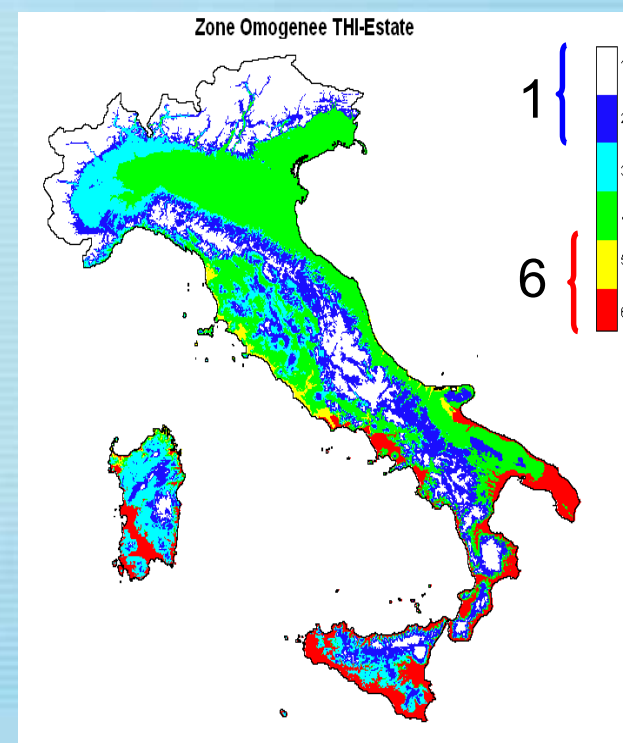
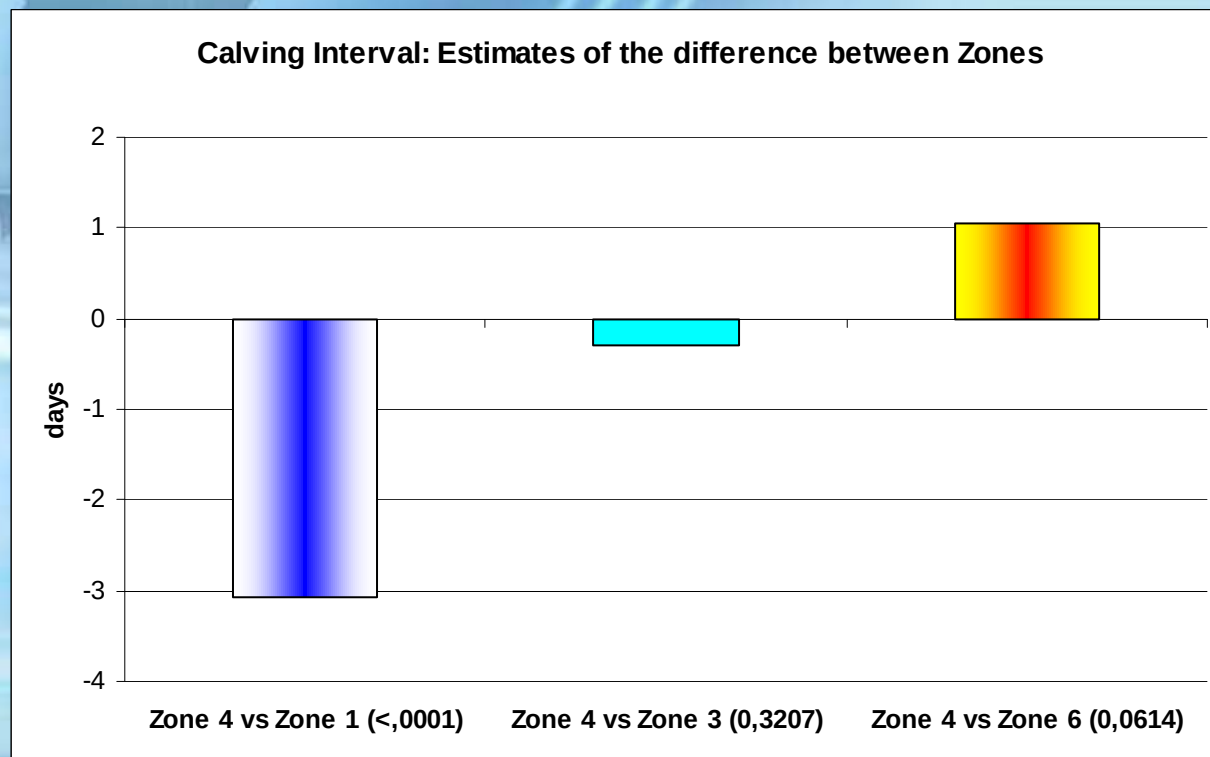


Short dtfs in zone 6

Results



Calving Interval

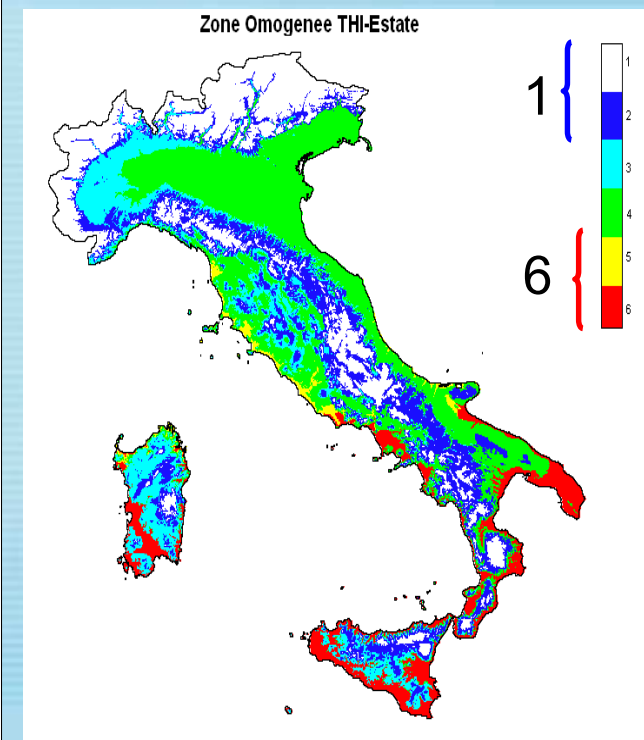
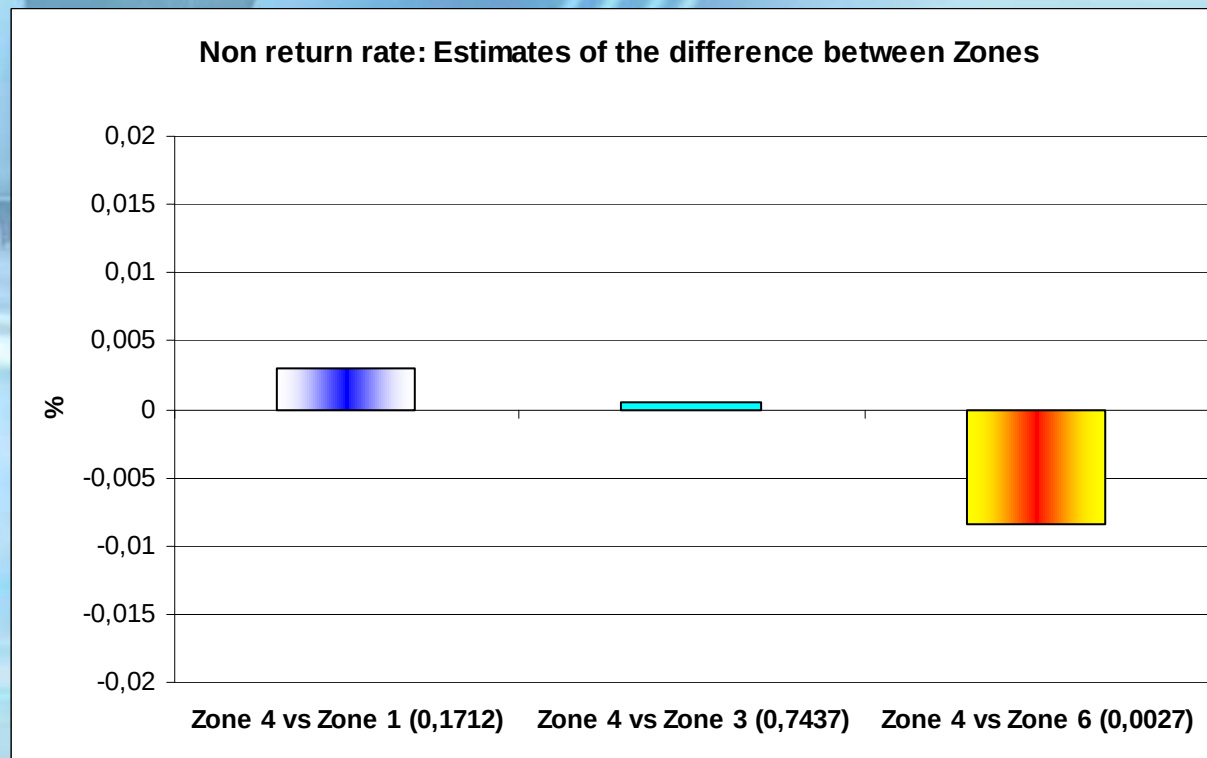


Effect only for Zone 4 vs Zone 1

Results



Climatic effect:



Effect only for Zone 4 vs Zone 6

Conclusions



- First test to evaluate the "climatic" effect on some reproductive traits (direct and correlated)
- Including a zone effect based on THI parameter has a slight effect on the analyses of reproductive traits
 - contradictory results for days to first service and non-return rate
 - shorter dtfs & higher nr56 in warmer areas
- Using a more complex model:
 - THI value for each herd
 - animal model