**Supplementary Material S1**

**Models for Statistical analysis**

The model for DMYwas defined as:

Where: is daily milk yield *v* in the *i*th environmental conditions, the *jth* parity order class, the *kth* gestation-lactation overlapping class, produced by the *rth doe*, in the *tth* lactation day , and with suckling kits. µ is an overall intercept; is the fixed effect of environmental conditions *i* (*i*=1 comfort; *i*=2 stress); is fixed effect of the parity order class *j* (3 levels: 1, 2 and ≥3); OGLk is the fixed effect of gestation-lactation overlapping class *k* (2 levels: overlapping and not overlapping); and are interaction terms between the respective factors; is a fixed quadratic polynomial regression on days in milk at time *t*; is a fixed quadratic polynomial regression on number of sucking kits of the doe *r* at time *t*; is a random quadratic polynomial on days in milk at time *t,* nested within doe *r;* this term capture the permanent effect associate to female *r*, which is common to all its lactations; is a random quadratic polynomial on days in milk at time *t* resulting from the combination between doe *r* and parity order *j*; thus this effect capture the permanent environmental effect of lactation, which is common to all records of a doe within each lactation; is the random residual term.

A second model for DMY included the interaction between environmental conditions and the quadratic fixed polynomial regression on days in milk, this model was considered to assess for differences between environmental conditions in the shape of the lactation curve.

The model for each of the major components of milk (DM, CP and E)was defined as:

Where was the content of DM, CP or E in the milk sample *k* at parity *j*, under environmental conditions *i*; is the random residual term. All the effects were defined in the same way as for DMY.

The model used for the analysis of ADFI and ADWI was defined as:

Where: was ADFI or ADWI *v* of doe *r* at week *t*, which was in parity order class *j,* and gestation-lactation overlapping class *k,*  lactation class *s,* had *o* suckling kits at lactation week *t*, and it was under environmental conditions *i*; was the number of sucking kits at the week of lactation *t* (), was the partial regression coefficient of ADFI or ADWI on number of sucking kits; was the random permanent effect of doe; was the random permanent effect of lactation and is the random residual term. All the other effects were defined as for DMY.

The model used for the analysis of DW was defined as:

where is the individual body weight *v* of a doe *r* at time *t* under environmental conditions *i*, gestation-lactation overlapping class *k;* is the covariate doe age at time *t*; is a random linear regression on doe age Tt,r*,* nested within doe *r;* this term capture the specific pattern of growth for each doe. is the random residual term. The interaction between EC and the linear effect of doe age was initially considered in the model but finally discarded, as it was a non-significant effect. All the other effects were defined as for DMY.

The model used for the analysis of IWW was defined as:

where is the individual weaning weight of a kit *v* under environmental conditions *i*, parity order class *j,* gestation-lactation overlapping class *k*, born in a litter *s* with *o* kits born alive; is the random permanent environmental effect of common litter. is the random residual term. All the other effects were defined as for DMY.

The model used for the analysis of SR was defined as:

Where: is survival rate of a litter *v* under environmental conditions *i*, parity order class *j,* gestation-lactation overlapping class *k*, of the doe *fr*. is the random residual term. All the other effects were defined as for DM.