Slaughtering performance and meat quality of medium-growing chicken fed black soldier fly live larvae

Valentina Bongiorno

Department of Veterinary Sciences
University of Turin, Italy

Québec City

12-16 June, 2022

valentina.bongiorno@unito.it

AVAILABLE STUDIES

Animal welfare

Slaughter performance

Growth performance

(Bellezza Oddon et al., 2021; Star et al., 2020; Veldkamp et al., 2019; Tahamtani et al., 2021; Ipema et al., 2020)

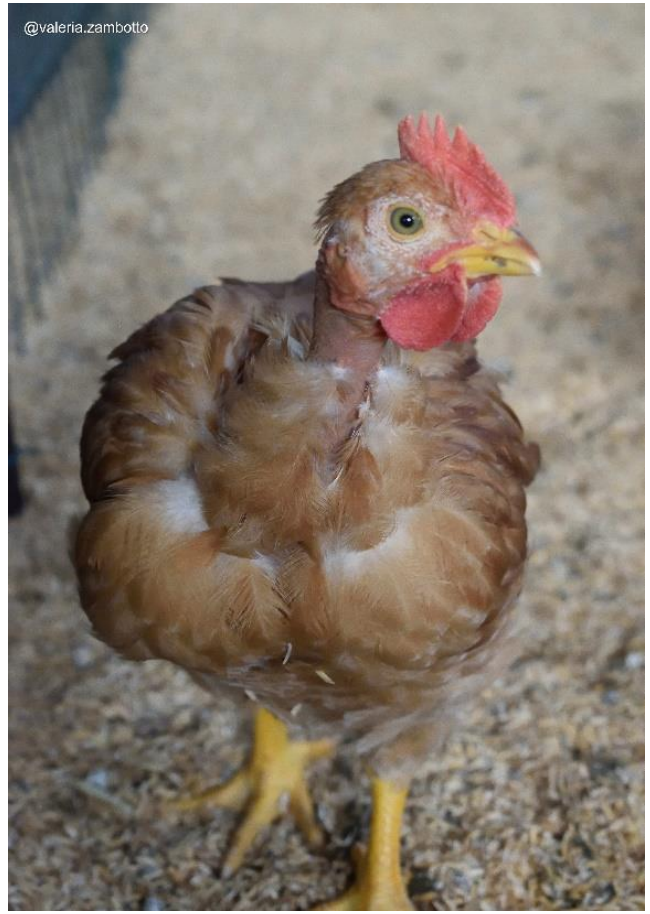
CHICKEN REARED

Label naked neck

Medium

growing

hybrid



82d rearing cycle

120 females + 120 males

28-82d of age

MATERIALS AND METHODS: experimental design

4 experimental groups, 6 replicates, 10 chicken/replicate (60 birds/treatment):

CM

♂

LM

♂

+

+10% HI supplementation based on DFI

CF

♀

LF

♀

+

+10% HI supplementation based on DFI

CM control male
CF: control female

LM: larvae male
LF: larvae female

DFI: daily feed intake
HI: *Hermetia illucens*

MATERIALS AND METHODS: growth performance

Weight and feed consumption recorded

- Average Weight (AW)
- Average Daily Gain (ADG)
- Average Daily Feed Intake (ADFI)
- Feed Conversion Ratio (FCR)

Periods of age:

- 28-35d
- 35-82d
- 28-82d

(n= 6) → single replicate as experimental unit

Consumption corrected for the DM of larvae

MATERIALS AND METHODS: slaughtering performance

SLAUGHTER (82d, 12 birds/treatment)

Registration of:

- Ready-to-cook carcass weight (RTCCw)
- Organs weight → relative weight (RW) calculation (%LW) of the heart, spleen, bursa of Fabricius (BF), liver, gut, and stomachs
- Cold carcass weight (CCw) after 24h refrigeration
- Carcass (LW%), thigh and breast yields (%CCw)

MATERIALS AND METHODS: meat quality

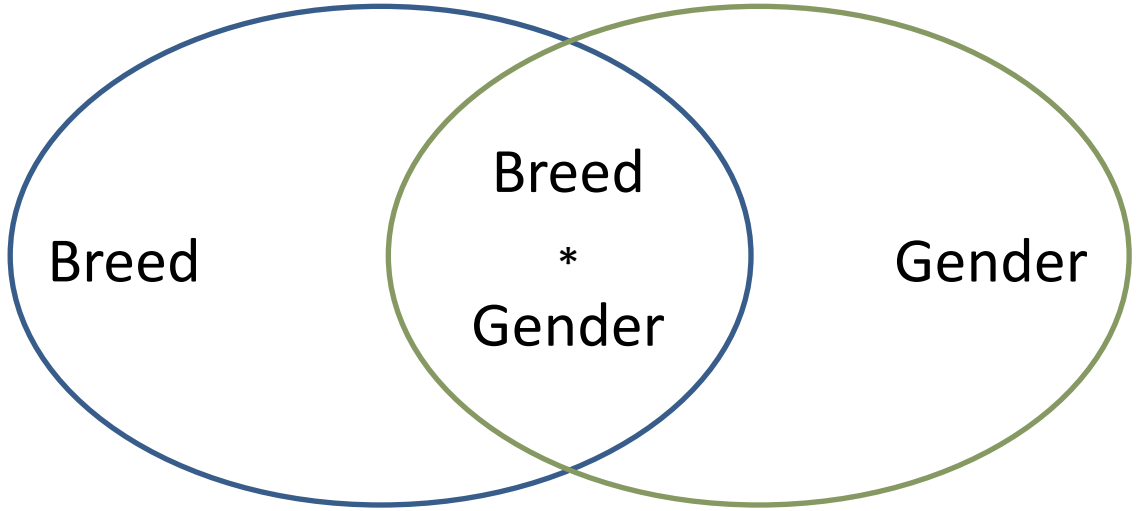
24h post-slaughter (4°C)

Evaluation of:

- Breast and thigh pH
- Breast and thigh color
- Drip losses

STATISTICAL ANALYSIS

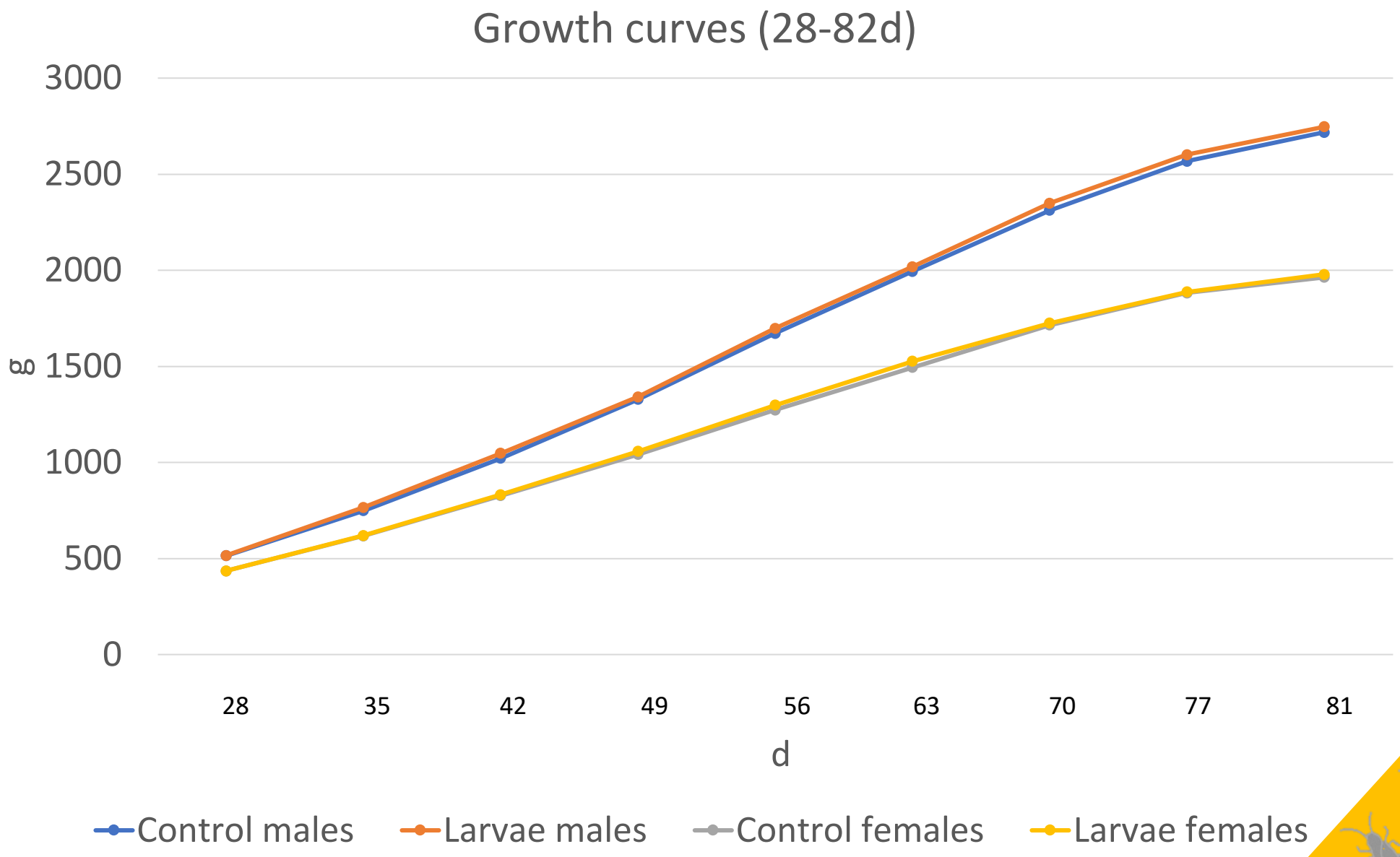
General Linear Model of fixed effects (two-way ANOVA) (SPSS software, $P<0.05$)



RESULTS: preliminary information

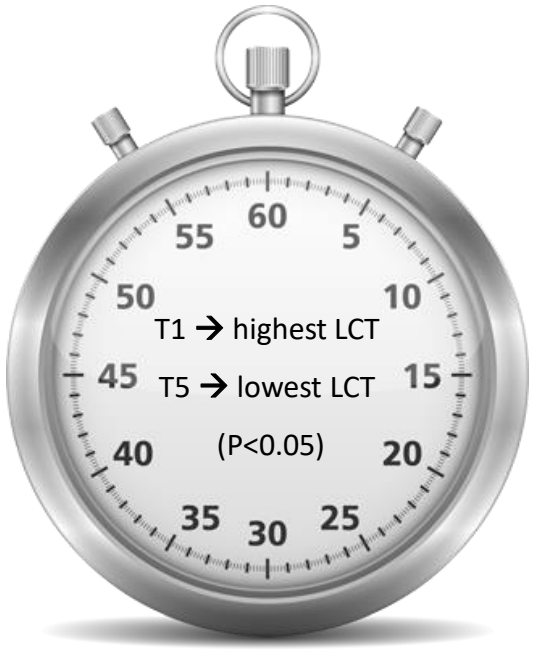
Live weight

Males > Females P<0.001



RESULTS: preliminary information

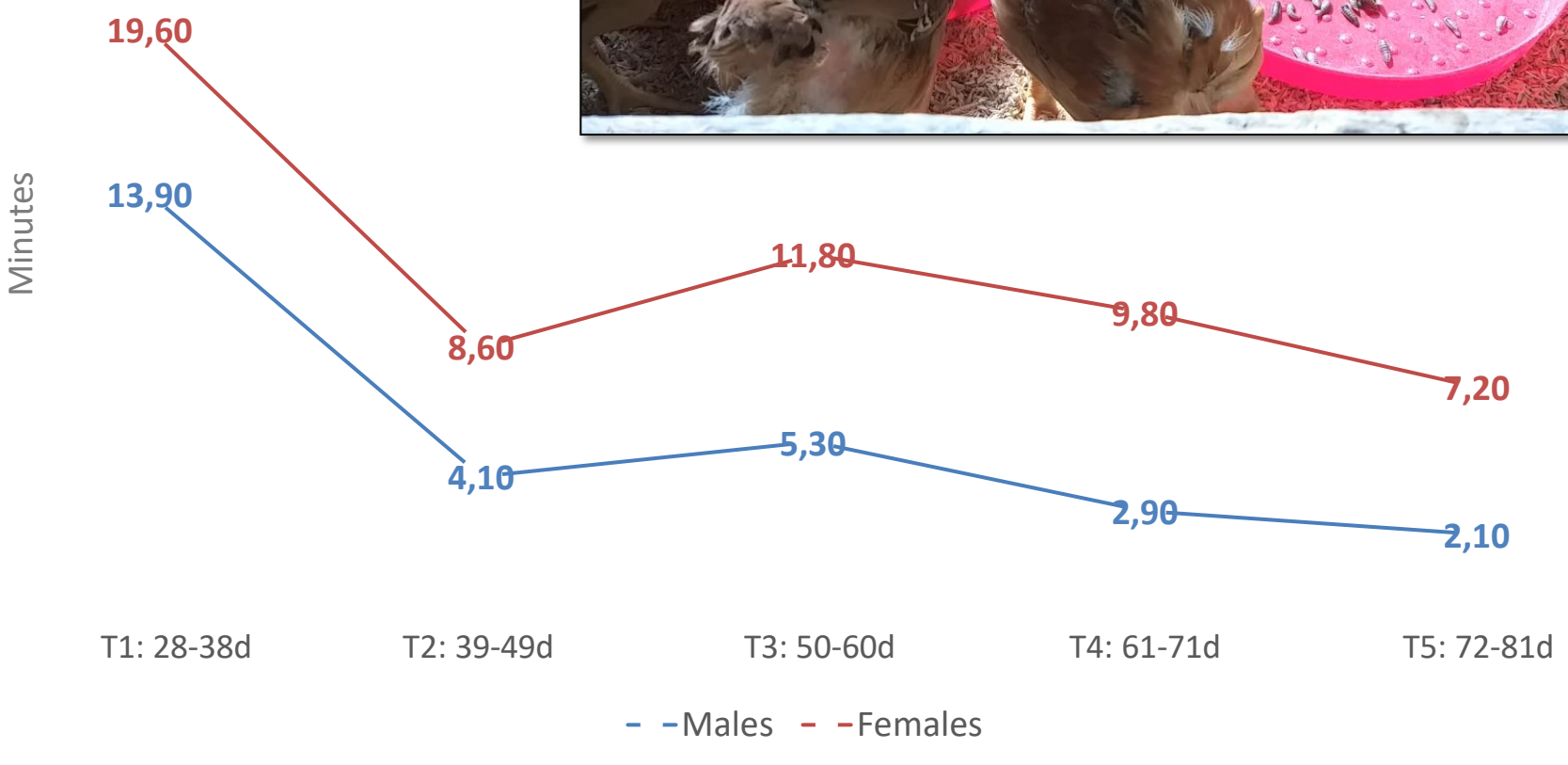
Larvae consumption time



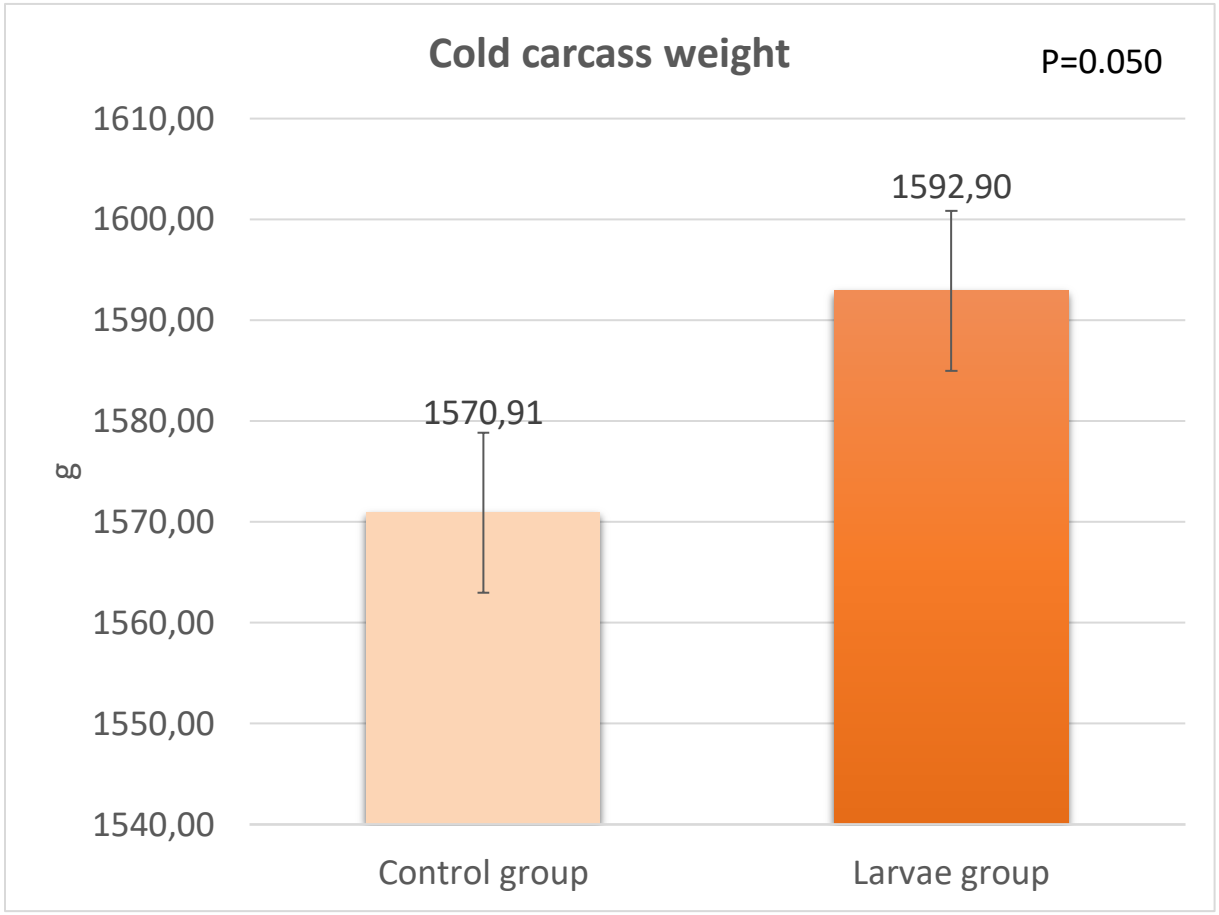
Generalized Linear Mixed Model

(GLMM, SPSS software, P<0.05)

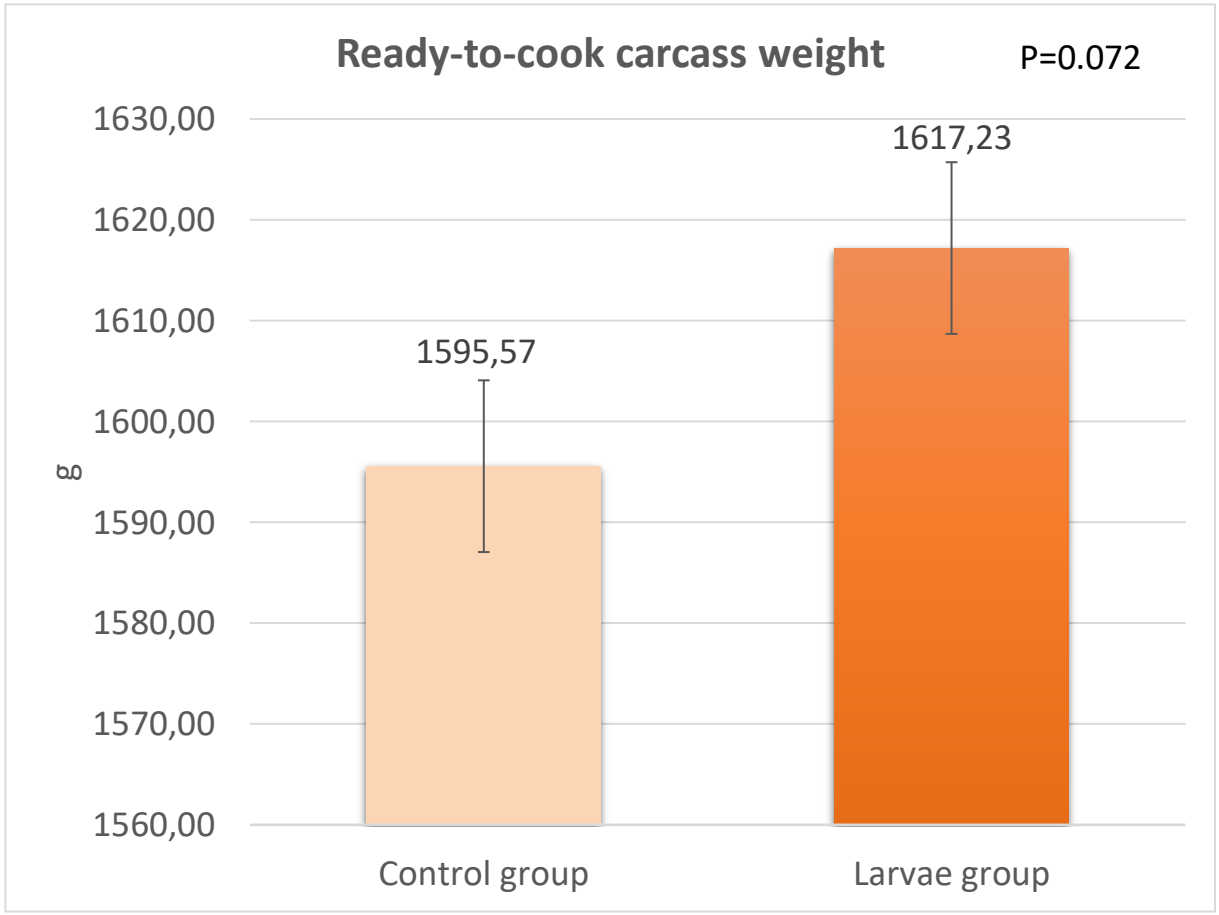
Time, Gender, Time*Gender



RESULTS: slaughter performance



Carcass weight



DISCUSSION: slaughter performance

Cold carcass weight

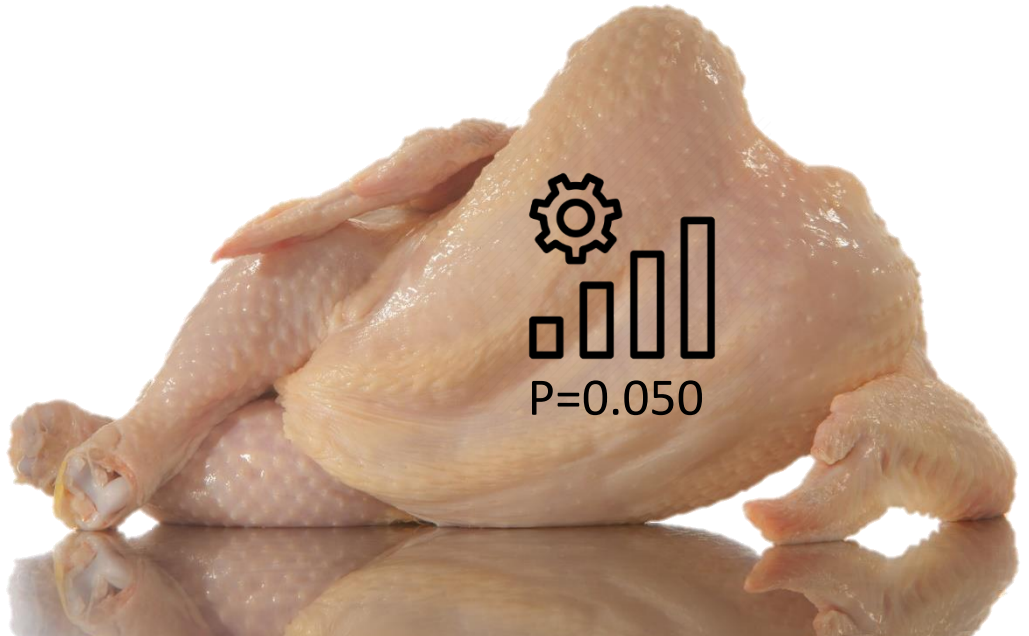
Ready-to-cook
Carcass weight

P=0.072

P=0.271

Drip losses

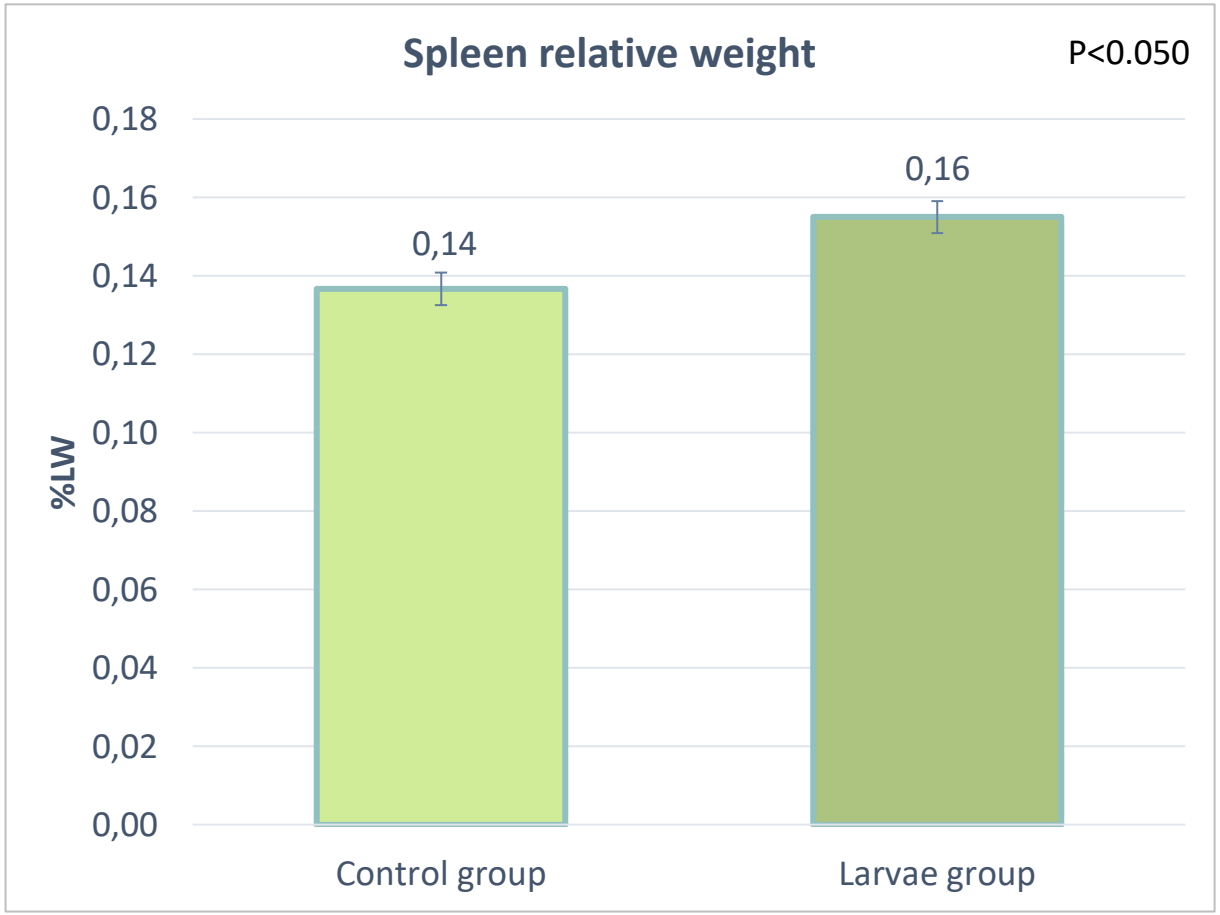
TREATED > CONTROL

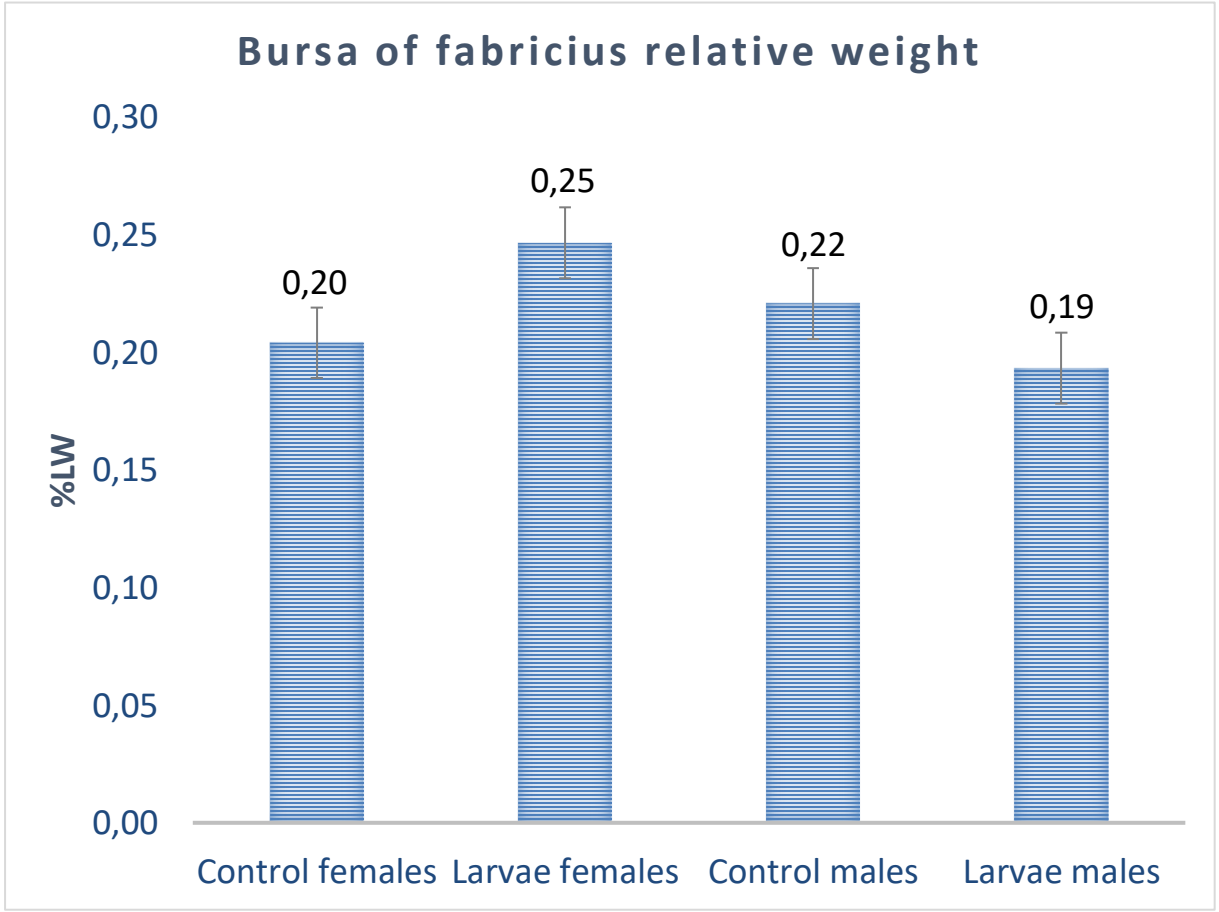


P=0.050

RESULTS: slaughter performance

Organs weight



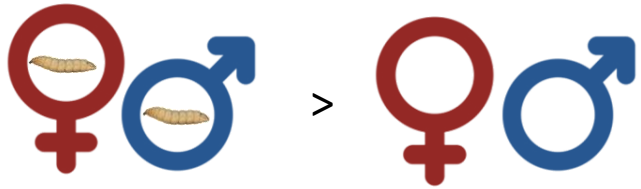


LF>CF
P<0.050

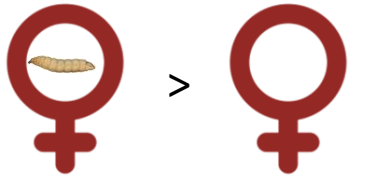
LF>LM
P=0.046

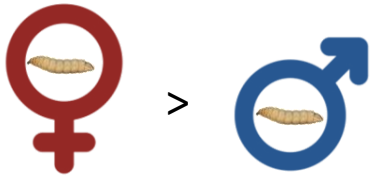
DISCUSSION: slaughter performance

Spleen relative weight

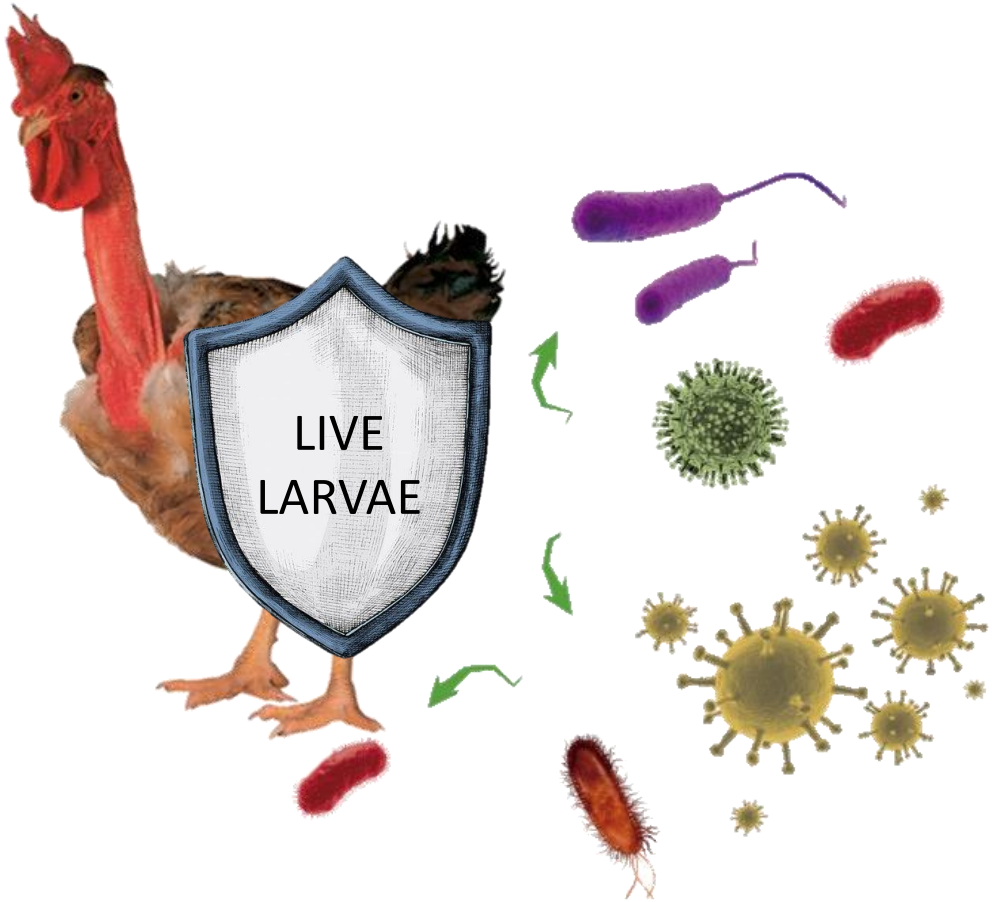


Bursa of Fabricious relative weight





→

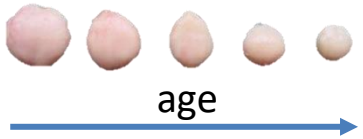


(Puvadolpirod and Thaxton, 2000; Bovera et al 2016; Bellezza Oddon et al 2021)

DISCUSSION: slaughter performance

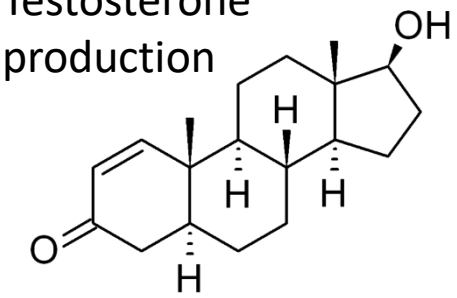
WHY NO SIGNIFICANT DIFFERENCES IN THE TREATED MALES COMPARED TO THE OTHER GROUPS?

BURSA OF FABRICIOUS

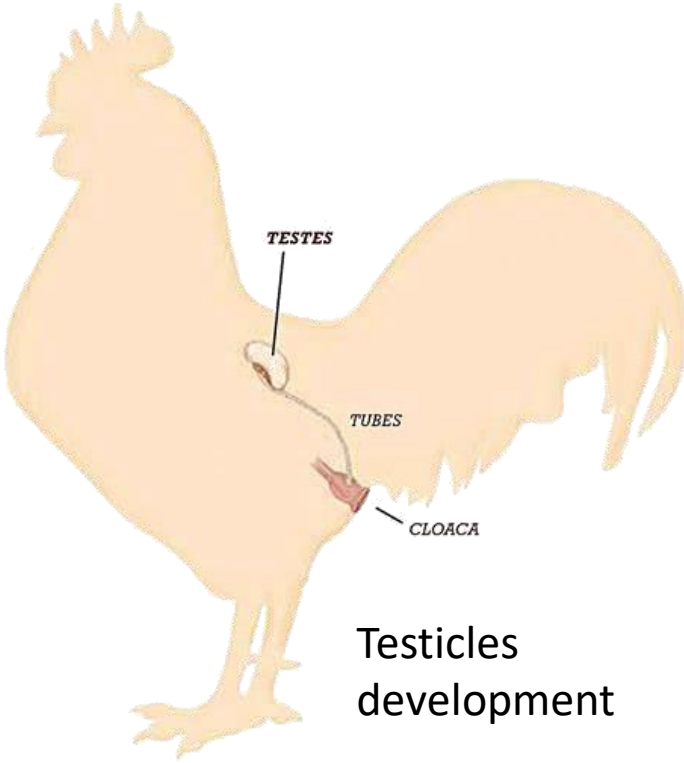


→

Testosterone production



→

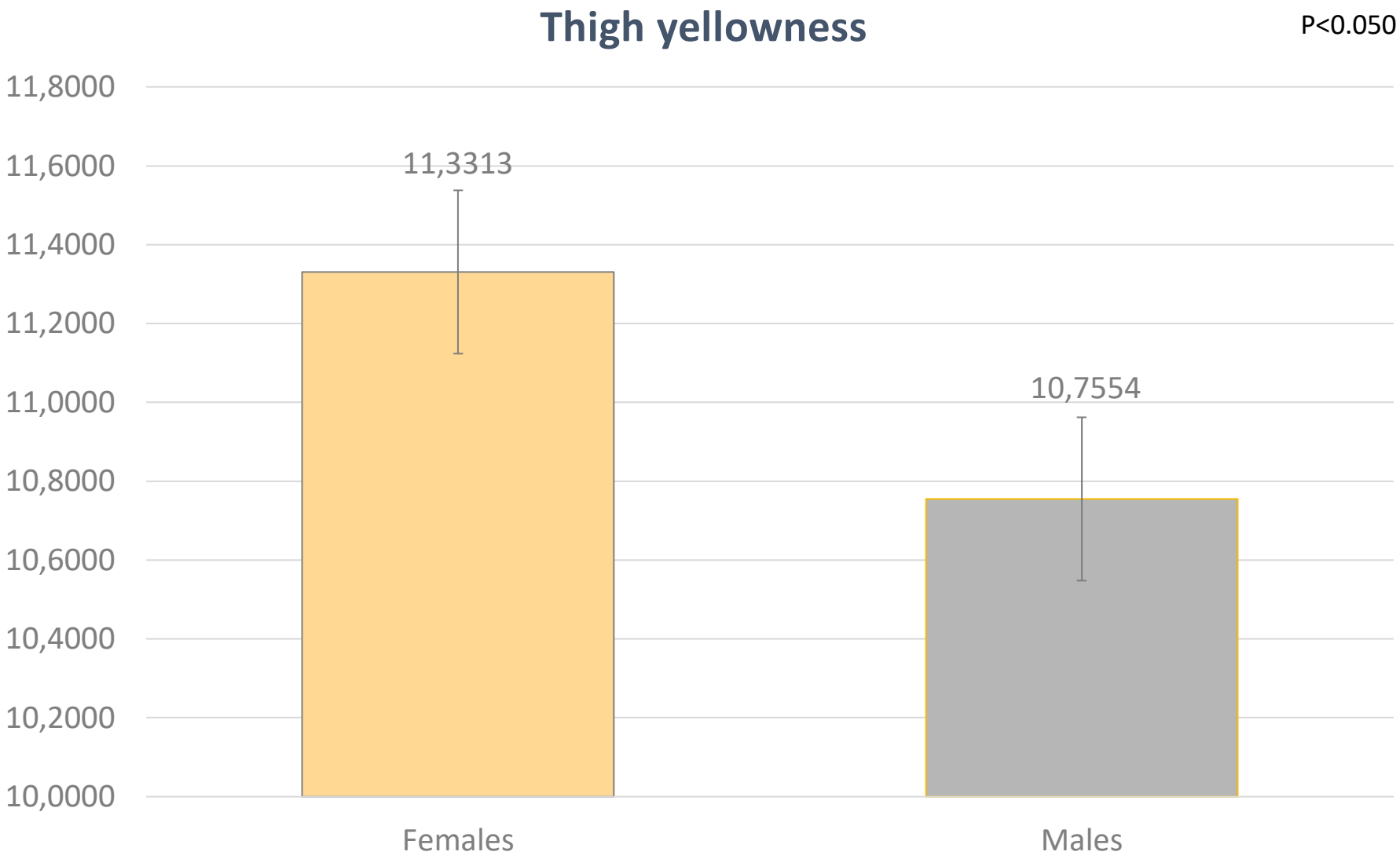


Testicles development

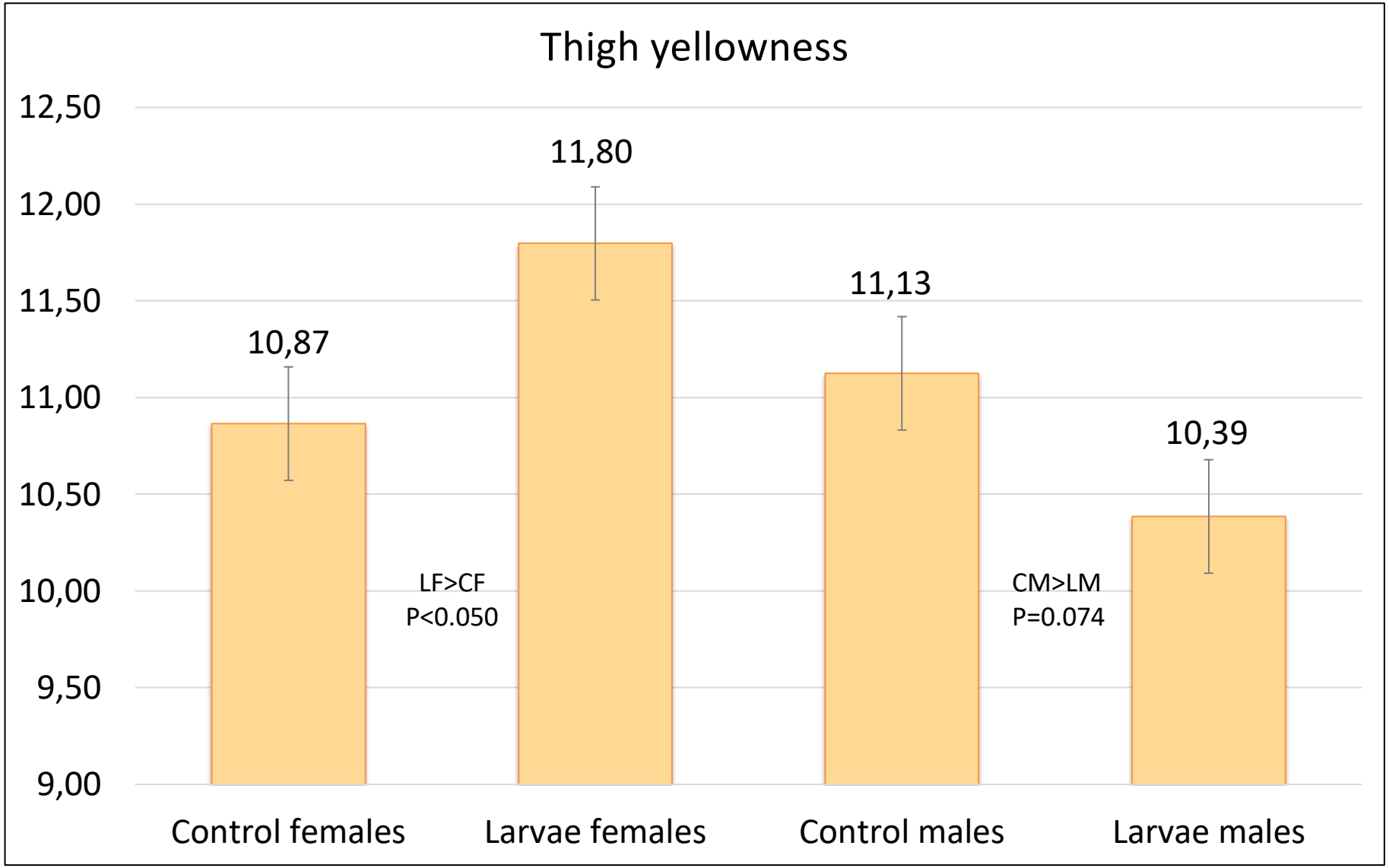
Live larvae provision effect mitigated by the hormonal activity

(Glick, 1956; Puvadolpirod and Thaxton, 2000)

RESULTS: meat quality

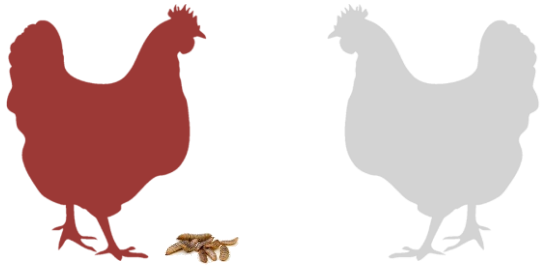


RESULTS: meat quality



DISCUSSION: meat quality

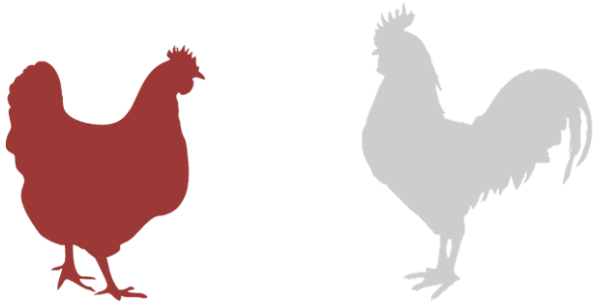
Thigh yellowness



TREATED > CONTROL

Higher fattines of treated females

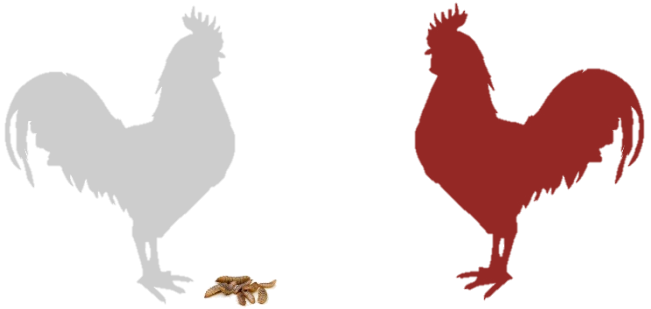
High deposition of pigments in treated females



FEMALES > MALES

Higher fattiness of females than males

lipophilic pigments stored in fat



TREATED < CONTROL

Less feed consumed by treated males

Low deposition of pigments in treated males

(Fletcher, 2002; Schiavone et al., 2019)

CONCLUSIONS

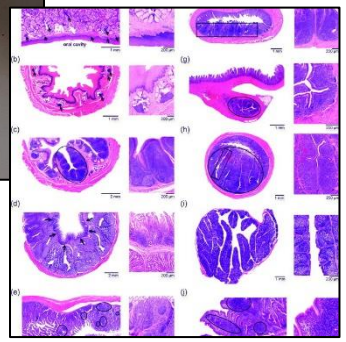
Live larvae provision

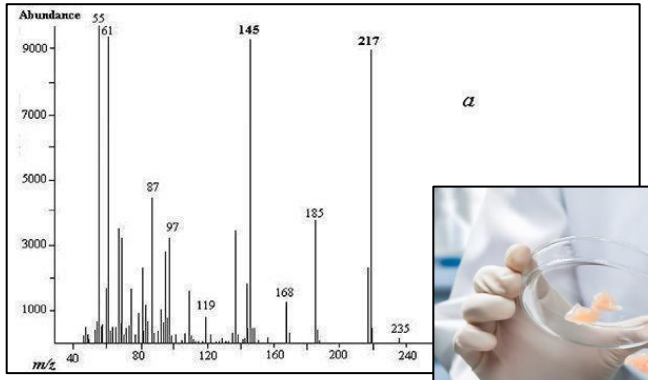
- No negative effects on the slaughter performance and meat quality of birds
- Immune system stimulation
- Affection of thigh meat yellowness → fat content → meat juiciness ?

Animal welfare

Microbiota analysis

Hystological analyses





Meat chemical composition

THANK YOU FOR THE ATTENTION