POULTRYNSECT

D2.2 Report on growth performance of slow growing poultry breed

Deliverable 2.2

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Abbreviations	
ADFI	Average Daily Feed Intake
ADG	Average Daily Gain
AW	Average Weight
BSF	Black Soldier Fly
CP	Crude Protein
DM	Dry Matter
FCR	Feed Conversion Ratio
MJ	Mega Joule
WP	Work Package

Content

Introduction

Introduction

The POULTRYNSECT Work Package 2 "Chickens in vivo feeding trials" wants to reduce the feed soybean intake of chicken by the administration of BSF live larvae as feed ingredient and increase the sustainability. The consumers' choices are broadly oriented by the animal welfare and environment sustainability, increasing the willingness in buying respectful-environment products (1; 2; 3). Soybean – the mainly protein source in chicken diet – represent a critical raw material as well for its unsustainability (4) and is widely studied to reduce its inclusion in chicken diet (5). The BSF is one of the most promising insects as soybean-replacement, by virtue of its nutritional profile, low feed conversion ratios and greenhouse gases emission (6; 7; 8; 9). Various experiments have already been conducted in laying hens, broilers, and turkeys, analysing the effects on birds' growth, health status and slaughtering performance (5; 6; 10; 11). A first trial about the BSF larvae supplementation in a medium-growing chicken hybrid was performed during the first year of the project, but no studies are currently available about slow-growing chickens.

The WP2 has three different objectives:

1) perform in vivo poultry feeding trial to determine the optimal inclusion level of live HI larvae for organic chicken production;

2) assess the gender effect on performances, welfare and health of birds fed live insect larvae;

3) assess in two different genotypes model (with different growing-rate) the effect on performances, welfare and health of birds fed live insect larvae.

For the first trial, the Label Naked Neck hybrid (medium-growing genotype) was reared for 82 days. The growth performances were recorded during the in-vivo trial to determine the FCR, ADG, ADFI and the average weight of birds.

For the second trial, a local Italian breed, Bianca di Saluzzo, was reared for 150 and 180 days, considering two different ages for the slaughtering.

This Deliverable reports the growth performance preliminary results obtained from the second *in vivo* trials performed on the Bianca di Saluzzo breed (UNITO).

1. Material and Methods

A total of 144 Bianca di Saluzzo male chickens were hatched and reared until 39 days at the Avian Conservation Centre of Local Genetic Resources of the University of Turin (north-west of Italy) and then selected for the experiment on the basis of the average body weight. The trial was carried out from the end of May until the middle of October. The initial weight of the birds was around 300 g.

Fig. 1. Bianca di Saluzzo chickens

The birds were allotted into 18 pens, after being selected and distributed in three experimental groups, according to the diet and live BSF larvae supplementation (8 chicken/pen, 48 birds/treatment):

1. birds fed commercial feed;
2. birds fed sustainable feed;
3. birds fed sustainable feed +15% live BSF larvae supplementation.

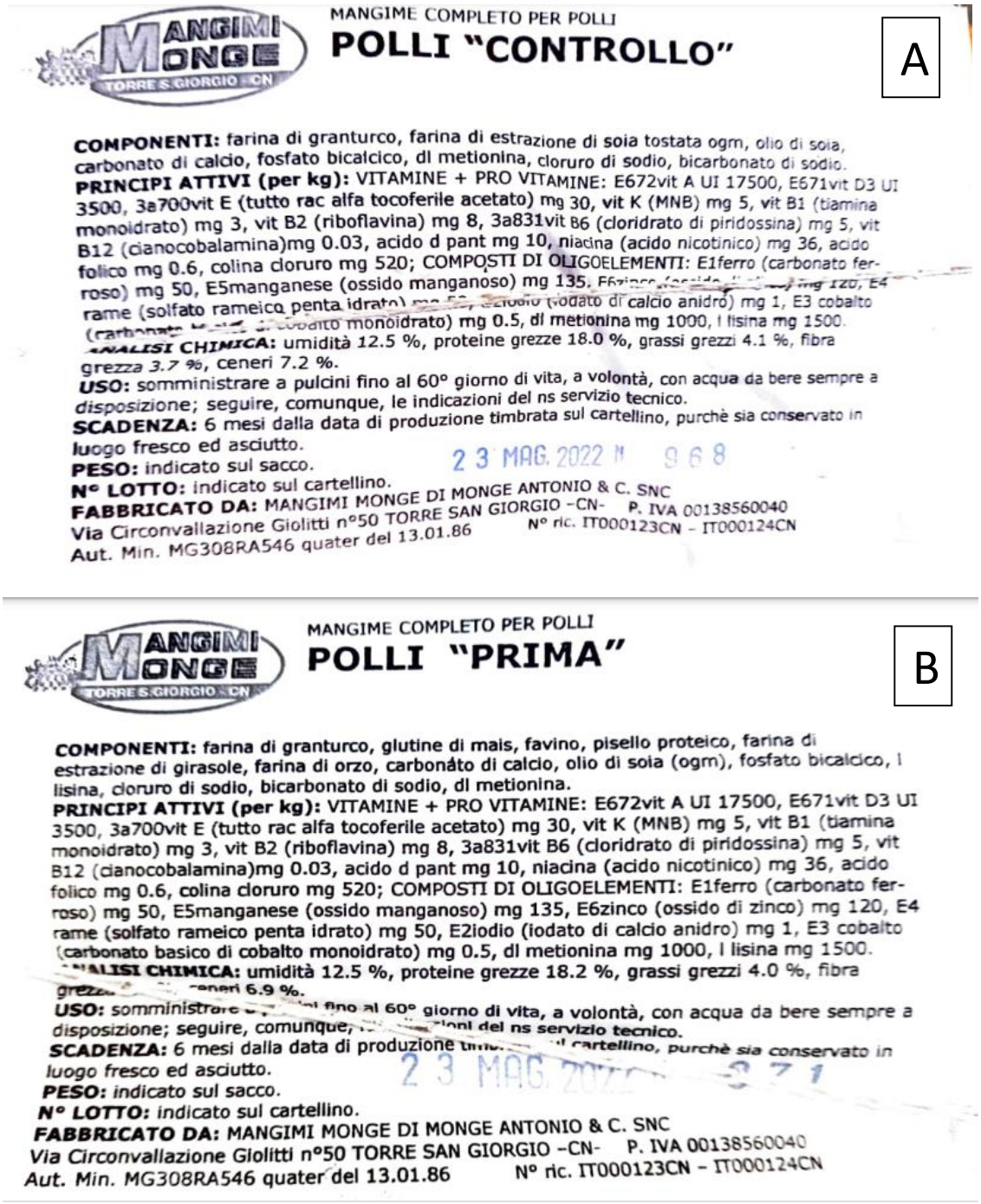
Feed and water were provided *ad libitum* (18 % crude protein, 4.1% crude fat for the commercial feed and 18.2% crude protein, 4% crude fat for the sustainable one) (Mangimi Monge di Monge Antonio e C. Snc). The feed composition of the commercial diet and the alternative one were respectively, as it follows, mainly composed by:

1. commercial diet: corn meal, soybean meal, soybean oil
2. sustainable diet: corn meal, corn gluten, field bean, pea protein, sunflower flour, barley flour

Feed labels of both diets are showed in Figure 2.
Natural ventilation and photoperiod (from 15L:9D in May, to 12L:12D in October) were applied for the entire experiment. Outdoor access was granted to the chickens from 49 days of age to the end of the trial. Health status of the birds was checked daily and the mortality recorded. The animals were weighted every 21 days in order to calculate the average weight (AW). Feed consumption was registered with the same frequency and the feed conversion ratio (FCR),

average daily feed intake (ADFI) and average daily gain (ADG) were calculated. The larvae dry matter (15.38%) was considered for the FCR calculation of the supplemented groups.

Fig. 2. Feed labels of the poultry diets: Label A (commercial feed) and Label B (sustainable feed)



MANGIMI MONGE TORRE S. GIORGIO (CN)

MANGIME COMPLETO PER POLLI

POLLI "CONTROLLO"

A

COMPONENTI: farina di granturco, farina di estrazione di soia tostata ogm, olio di soia, carbonato di calcio, fosfato bicalcico, dl metionina, cloruro di sodio, bicarbonato di sodio.
PRINCIPI ATTIVI (per kg): VITAMINE + PRO VITAMINE: E672vit A UI 17500, E671vit D3 UI 3500, 3a700vit E (tutto rac alfa tocoferile acetato) mg 30, vit K (MNB) mg 5, vit B1 (tiamina monoidrato) mg 3, vit B2 (riboflavina) mg 8, 3a831vit B6 (cloridrato di piridossina) mg 5, vit B12 (cianocobalamina)mg 0.03, acido d pant mg 10, niacina (acido nicotinico) mg 36, acido folico mg 0.6, colina cloruro mg 520; COMPOSTI DI OLIGOELEMENTI: E1ferro (carbonato ferroso) mg 50, E5manganese (ossido manganoso) mg 135, E6zinco (ossido di zinco) mg 120, E4 rame (solfato rameico penta idrato) mg 50, E2iodio (iodato di calcio anidro) mg 1, E3 cobalto (carbonato basico di cobalto monoidrato) mg 0.5, dl metionina mg 1000, l lisina mg 1500.
ANALISI CHIMICA: umidità 12.5 %, proteine grezze 18.0 %, grassi grezzi 4.1 %, fibra grezza 3.7 %, ceneri 7.2 %.
USO: somministrare a pulcini fino al 60° giorno di vita, a volontà, con acqua da bere sempre a disposizione; seguire, comunque, le indicazioni del ns servizio tecnico.
SCADENZA: 6 mesi dalla data di produzione timbrata sul cartellino, purchè sia conservato in luogo fresco ed asciutto.
PESO: indicato sul sacco.
23 MAG. 2022 968
N° LOTTO: indicato sul cartellino.
FABBRICATO DA: MANGIMI MONGE DI MONGE ANTONIO & C. SNC
Via Circonvallazione Giolitti n°50 TORRE SAN GIORGIO -CN- P. IVA 00138560040
Aut. Min. MG308RA546 quater del 13.01.86 N° ric. IT000123CN - IT000124CN

MANGIMI MONGE TORRE S. GIORGIO (CN)

MANGIME COMPLETO PER POLLI

POLLI "PRIMA"

B

COMPONENTI: farina di granturco, glutine di mais, favino, pisello proteico, farina di estrazione di girasole, farina di orzo, carbonato di calcio, olio di soia (ogm), fosfato bicalcico, l lisina, cloruro di sodio, bicarbonato di sodio, dl metionina.
PRINCIPI ATTIVI (per kg): VITAMINE + PRO VITAMINE: E672vit A UI 17500, E671vit D3 UI 3500, 3a700vit E (tutto rac alfa tocoferile acetato) mg 30, vit K (MNB) mg 5, vit B1 (tiamina monoidrato) mg 3, vit B2 (riboflavina) mg 8, 3a831vit B6 (cloridrato di piridossina) mg 5, vit B12 (cianocobalamina)mg 0.03, acido d pant mg 10, niacina (acido nicotinico) mg 36, acido folico mg 0.6, colina cloruro mg 520; COMPOSTI DI OLIGOELEMENTI: E1ferro (carbonato ferroso) mg 50, E5manganese (ossido manganoso) mg 135, E6zinco (ossido di zinco) mg 120, E4 rame (solfato rameico penta idrato) mg 50, E2iodio (iodato di calcio anidro) mg 1, E3 cobalto (carbonato basico di cobalto monoidrato) mg 0.5, dl metionina mg 1000, l lisina mg 1500.
ANALISI CHIMICA: umidità 12.5 %, proteine grezze 18.2 %, grassi grezzi 4.0 %, fibra grezza [illegible] ceneri 6.9 %.
USO: somministrare [illegible] fino al 60° giorno di vita, a volontà, con acqua da bere sempre a disposizione; seguire, comunque, [illegible] del ns servizio tecnico.
SCADENZA: 6 mesi dalla data di produzione [illegible] sul cartellino, purchè sia conservato in luogo fresco ed asciutto.
PESO: indicato sul sacco.
23 MAG. 2022 971
N° LOTTO: indicato sul cartellino.
FABBRICATO DA: MANGIMI MONGE DI MONGE ANTONIO & C. SNC
Via Circonvallazione Giolitti n°50 TORRE SAN GIORGIO -CN- P. IVA 00138560040
Aut. Min. MG308RA546 quater del 13.01.86 N° ric. IT000123CN - IT000124CN

2. Preliminary results and discussion

In order to assess the direct effect of larvae supplementation, this section will include the preliminary results only between the larvae supplemented animals and the sustainable fed-ones.

Overall, the growth performances were positively influenced by the live larvae provision, especially in the latter periods of age (P<0.05) (**Figure 3**). As far as growth parameters are concerned, significant differences were recorded among the groups, taking into account six periods of age (d), divided into: 39-59 d, 60-80 d, 81-101 d, 102-122 d, 123-146 d and 147-174 d.

The supplemented groups revealed a better FCR and ADG than the sustainable-fed ones. More in detail, both the ADG and the FCR in the second period (60-80 d) and along the whole trial (39-174 d) were higher in treated birds compared to the sustainable-fed ones (P<0.05 both) (**Figure 4 and 5**). During the trial, the larvae-fed animals namely displayed a higher ADFI in the 4th (102-122 d), final (147-174 d) and whole period (39-174 d) (P<0.05) (**Figure 6**).

In conclusion, live larvae provision could improve the FCR and ADG of young birds. Moreover, since no negative results were observed in the first period (39-59 d), the live larvae supplementation should be promoted at this bird age even in a slow growing breed, with inclusion rates higher than 10%.

Fig. 3. Growth curves of the two experimental groups

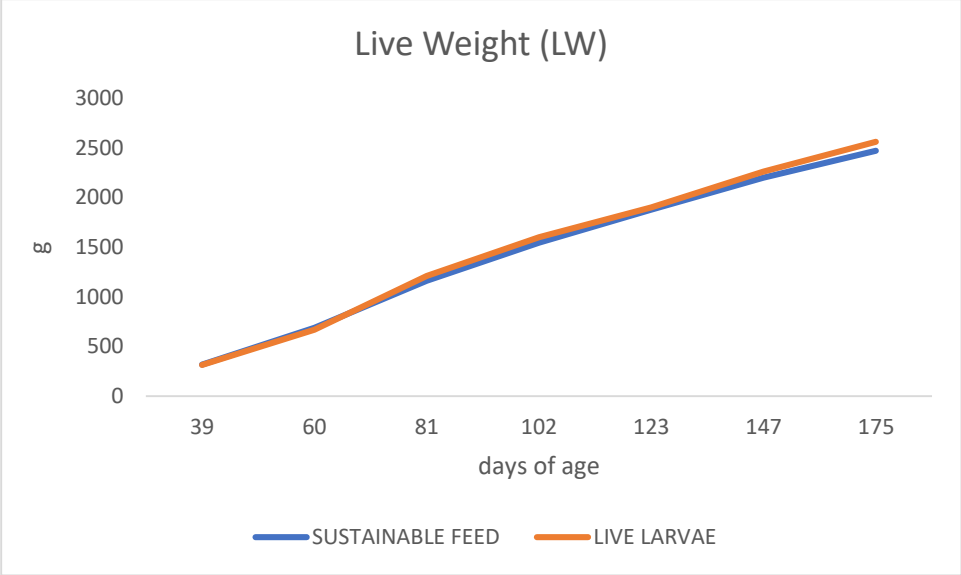
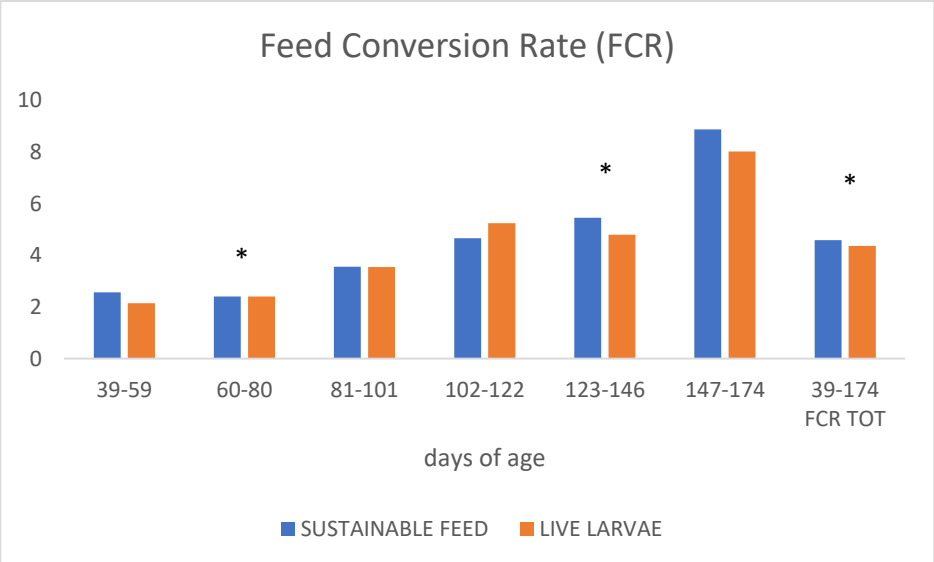


Fig. 4. Feed Conversion Rate **(** FCR) of treated and sustainable-fed groups during all the six periods (n = 6 pen; 8 birds/pen). *P<0.05



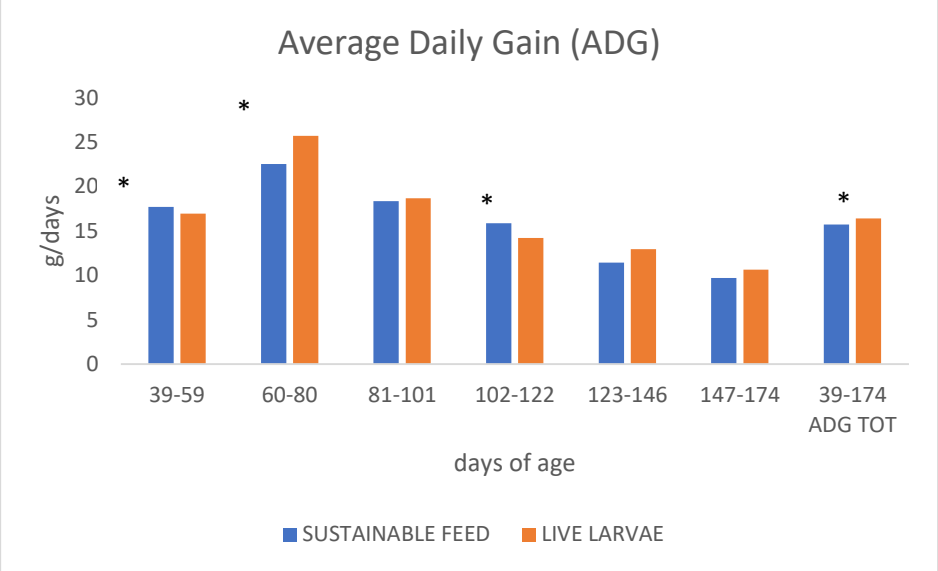
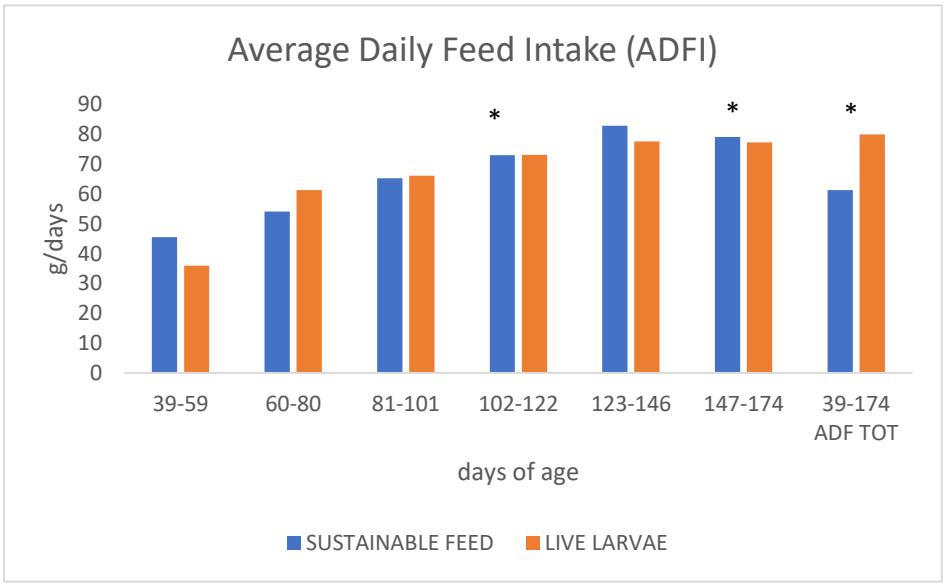


Fig. 5 ADG of treated and sustainable-fed groups during all the six periods (n = 6 pen; 8 birds/pen). *P<0.05

Fig. 6 ADFI of treated and sustainable-fed groups during all the six periods (n = 6 pen; 8 birds/pen). *P<0.05



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