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Effects of on-farm hatching on performance, adaptive capacity, and animal welfare of slow-growing broiler chickens

A. Collin, Y. Guyot, C. Bonnefous, C. Souchet, D. Bouvry, J. Castagnet, C. Molette, F. de Louw, A. Rédo, L. Ravon, K. Germain, S. Métayer-Coustard, C. Chibanda, P. Thobe, A. Travel, L. Guilloteau



SEMINAR “Early life strategies to improve health, welfare and resilience in later life for layer pullets and broiler chickens within low-input and organic production systems”

WUR, Wageningen, The Netherlands

21st May, 2024

PPILOW Context of PPILOW task on early life management levers



Small batches of chicks
of specific
slow-growing genotypes



Farms far from the hatchery:
long transport



Different hatching times +
delay before delivery on farm:
Risk of dehydration

➔ **Means for limiting chick perturbation and stimulating adaptive capacities in slow growing chickens?**

Impacts on welfare, chick quality, physiology, health, performance and resilience

PPILOW Choice of an early-life management lever with the French PPILOW National practitioner group (NPG)

From spring 2022



<https://www.one2born.com/en/product/>

On-farm hatching

Industrial set-ups or simple designs described
Van de Ven et al., 2009; De Jong et al., 2018;
Giersberg et al., 2020; Molenaar et al., 2023
Guilloteau et al., 2024

Slow-growing lines, alternative systems?
Jessen et al., 2021

First comments from NPGs members:

- Interesting for small structures located far from the hatchery? Potential interest for the farmer for limiting chick stress and good for the communication towards local consumers
- For bigger farms, less interest expressed: possible density limitations due to lower hatching rates and higher heating costs?



Hatching rates:

- 97.7% in average from E18-set fertilized and candled eggs
- Hatching from E19



Optimization of the conditions: gas radiants set at 34.5°C and temperature probe on eggs 40 cm far from the radiant plumb line

Indications from Wageningen University: around 6 cm litter, avoid overheating

Keep ambient temperature around the eggs >33°C and eggshell temperature at 36-37°C

Small-scale farm



Ferme moonriver



Unienville, Aube



Contact

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Chick house of $3 \times 2 \times 0.6 \text{ m}^3$ in 42 m^2 mobile house
2 buildings in parallel (2 repetitions)

Farm quite far from the hatchery (317 km)

First assays to measure temperature with
thermobuttons on table egg trays and modelize
2 electric radiants: heat maps
(regulated first at 34 and 35°C)



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D. Bouvry, Moonriver©

- Hubbard G657N
- 2 trials with batches of 550 eggs; incubation at INRAE experimental hatchery
- Half of eggs transported at incubation embryonic day 18 to the organic farm
- Half of chicks transported at day 1

- Vaccination of the chicks after hatching
- Heating blanket and 2 electric radiants for keeping temperature between 33 to 36°C around the eggs
- Few eggs both incubated and hatched on-farm for comparing in trial 1

- Adjustment of conditions for optimizing eggshell temperature in trial 1 and measurements until slaughter age for trial 2

One2Born
53 x 29 x 4,9 cm



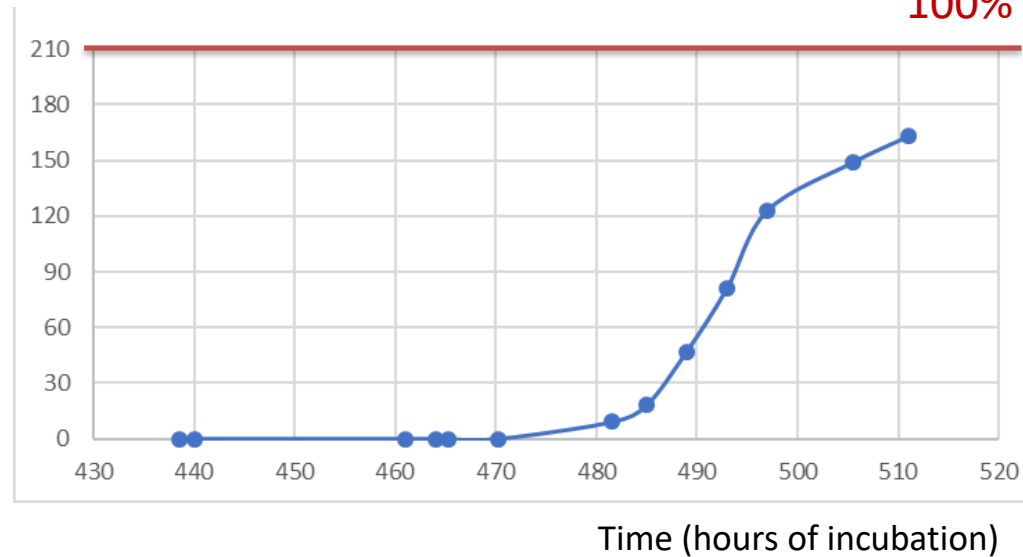
Semi-experimental study with One2Born device in chick house within a mobile poultry house

Results of the first trial

- Overheating: in the middle of the trays during transport; non-optimal hatchability
- Slightly better results with on-farm incubation (78 -> 84%)



Number of hatched eggs





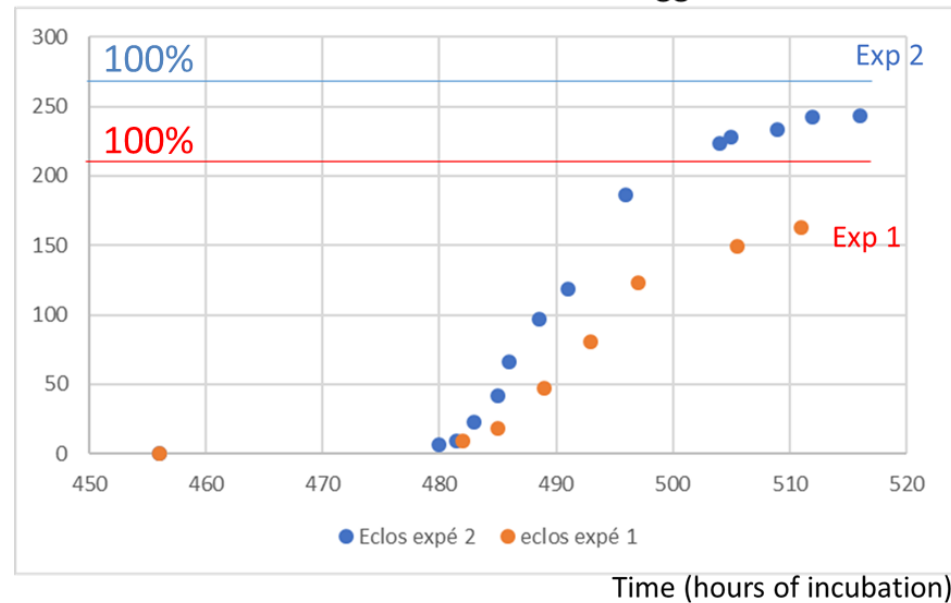
- Optimization for batch 2: no strong electric radiants but a small ventilating one + heating blanket
- Different design during transport to avoid overheating



	On-farm hatching	Hatchery
Hatching rate (%)	90.4	94.0
BW at D1 (g)	40	37
FCR (g/g)	3.219	3.028
Mortality (%)	4.20%	1.46 %

- Better welfare indicators (EBENE®)
- Interesting to be tested for the farmer, but difficult T° control
- Necessity to vaccinate on farm (Marek, IB)
- More time needed and more stressful but rewarding
- More energy consumed with on-farm hatching
water consumption / hatchery?

Number of hatched eggs



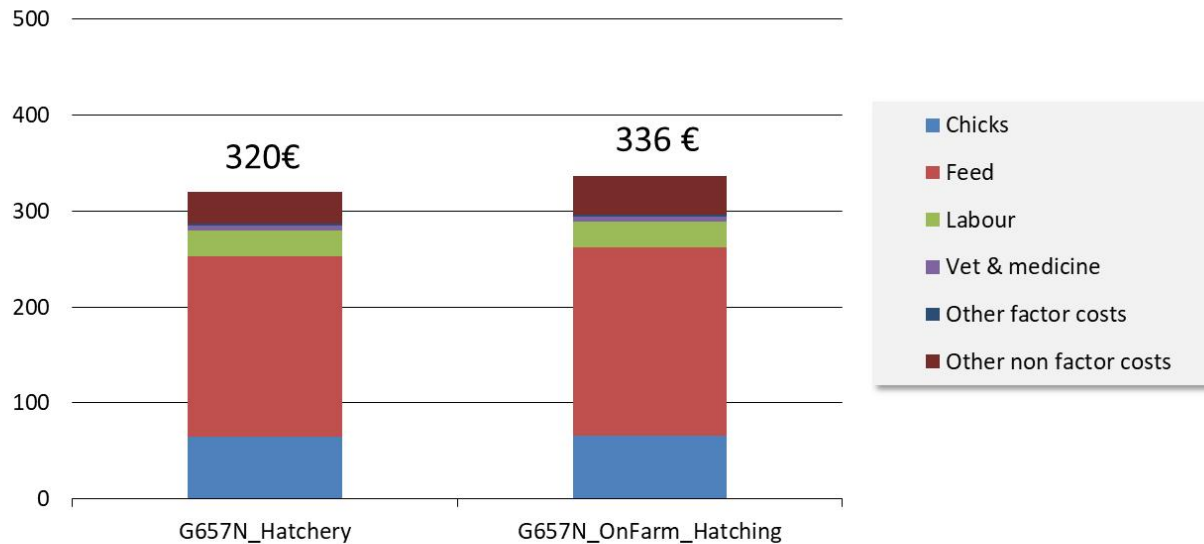
Additional information from economic analysis in Organic farm



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- The organic farm using chicks sourced from the hatchery is slightly more efficient in terms of feed-use as it has a lower FCR and higher Daily weight gain
- This is reflected in the production costs: the on-farm hatching has slightly higher production costs (+ 4,9 %)

Comparison of total costs of production (EUR/100kg live weight)



The two conditions were however profitable since in direct sale at 9.2€/kg carcass, the returns were much higher than the full costs

On-farm hatching in a French label-type farm with slow-growing chickens

Jean CASTAGNET

euràlis
NOURRIR VOTRE CONFIANCE

ITAVI



PPILOW Farm set-up

On-farm with radiant vs hatchery
Summer 2022 – France South-West

- ⇒ Same flock and setter at hatchery
- ⇒ In ovo vaccination at I18- Vaxxiteck

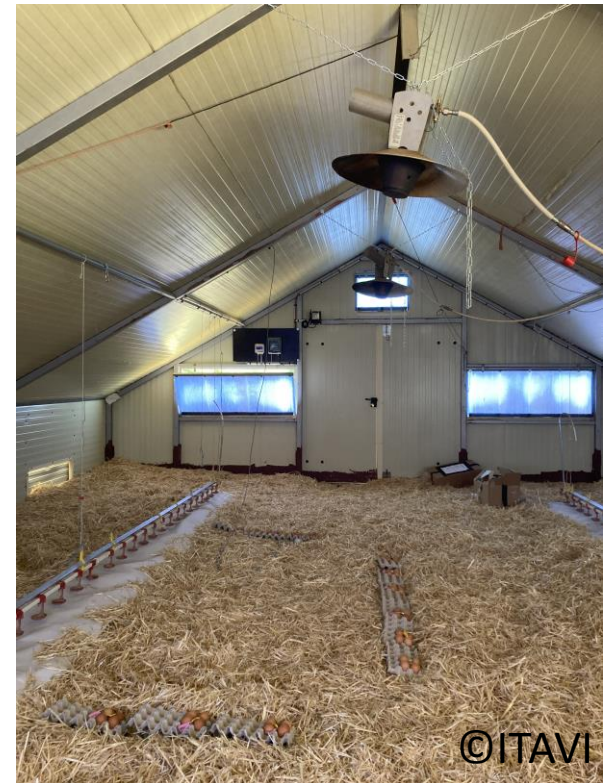
2 poultry houses on-farm hatching
VS
6 poultry houses hatchery chicks

No dynamic ventilation

⇒ Difficult to cool

euräus
NOURRIR VOTRE CONFIANCE

ITAVI



©ITAVI

⇒ Adaptation of the heating system (gas radiant position)

CARNOT France
Futur
Élevage
ChickBoom

PPILOW

Eggs: Ovoscan continuous measurement of eggshell temperature



© BD France

Ambient temperature, relative humidity, CO2



One2Born device





Measurements



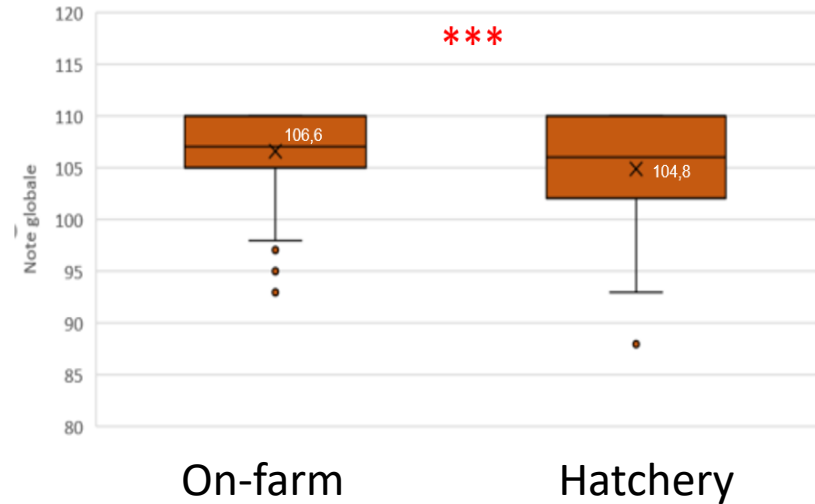
- Hatchability and chick quality
- Growth
- Sorting and viability
- Data at slaughter data
- Feedback from the farmer

No follow-up of feed consumption

Hatchability and chick quality

	On-farm hatching	Hatchery
Hatching rate	96.73 %	95.20 %

Very good results on-farm



Chick quality scores

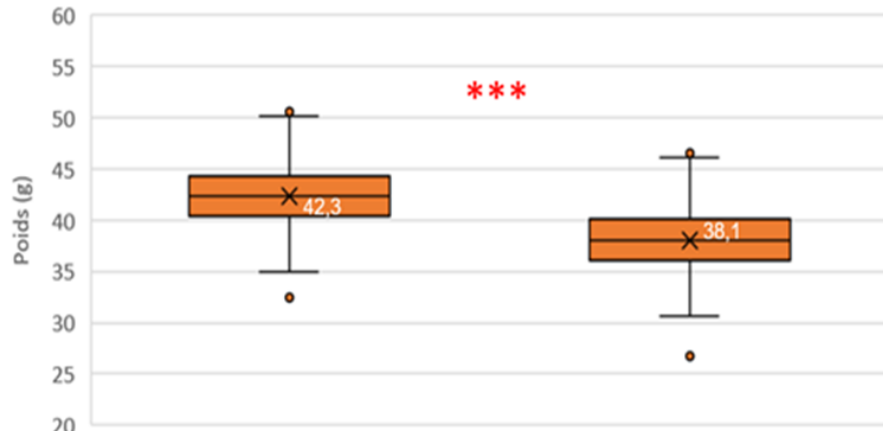
On-farm hatching > Hatchery



© ITAVI

Growth

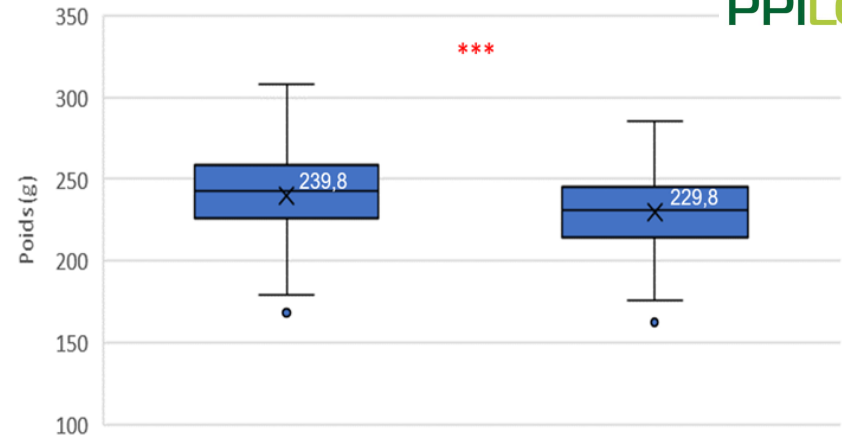
BW at d1 (g)



On-farm

Hatchery

BW at d17 (g)



On-farm

Hatchery

©ITAVI

+ 37 g at slaughter age (81d): 1d of rearing gained!

+ 16 g/carcass for on-farm hatching but not significant

Mortality and carcass appearance

Very low mortality (< 1%) in both systems

Carcasse Indicators	On-farm hatching	Hatchery
Downgraded	9.6 %	11.6 %
Seized	0.4%	0.7 %

Less recent scratches or wounds on the carcasses

Conclusion

On-farm hatching vs. hatchery



Better performance and quiet catching



More stressful for the farmer, work load (preparation, placement, shorter period between flocks,...) but much rewarding



Performance gains that may not always compensate for egg cost, time and energy spent => commercial valorization?

No real control of chick numbers (mandatory chicken density limitations!)



Conclusions

- Very interesting in label-type farm with controlled gas radiants



- In low-input independent organic farm with small batches



More difficulty to maintain an homogeneous temperature with 4 pt lower hatching rates

More difficult to obtain I18 vaccinated eggs, no control on the sex ratio and chicken density

-> Also consider on-farm incubation (+ on-farm hatching?)

- Interest of German organic farmers to test on-farm hatching from these results

PPILOW PARTNERS



Many thanks to the members of the National Practitioner Groups of PPILOW involved

Thank you for your attention

www.ppilow.eu