



Coop Research Program

# Elements of successful novel dual-purpose chicken production systems

**Chickens are most often bred for either egg or meat production. Hence, every year millions of male layer-type chicks are eliminated (or culled). In addition, chickens are fed resource-intensive high-protein diets. This project assessed the potential of farming chickens that produce both eggs and meat (dual-purpose) as an alternative to chick culling and high-protein diets. Dual-purpose males showed a growth performance similar to varieties used in organic farming in Switzerland and tolerated low-protein diets better than specialized types. Consumers were willing to pay more for dual-purpose eggs.**

## Motivation

Chicken is an important animal protein source worldwide. Today, poultry is bred and reared either for egg or meat production, resulting in decoupled specialized breeding lines (layers and broilers). Healthy, day-old layer-type males are eliminated (2.5 million chicks per year in Switzerland) due to their inability to lay eggs and their poor growth performance, raising ethical concerns. In addition, the diet of specialized chickens is protein-rich and contains human-grade foods that are resource-intensive to produce. One potential solution is to use dual-purpose chickens, where females are used to produce eggs and males are fattened for meat, and to feed them with low-protein diets.

## Objective

The overall research objective was to investigate the performance of dual-purpose chicken production systems under conventional and low-protein diets. The project also investigated Swiss consumers' attitudes and willingness to pay for dual-purpose products.

## Research Highlights

This project showed that in organic farming systems, dual-purpose types are a viable alternative to sacrificing layer-type chicks. Researchers compared egg and meat production of commercial dual-purpose chickens, Lohmann Dual and Novogen Dual, with layer types and fast-growing and slower-growing broiler-types grown using conventional and low-protein diets. The fast-growing broilers, commonly used in conventional farming and fattened for 35 days, outperformed dual-purpose types in terms of growth rate and carcass weight. Therefore, the use of dual-purpose chickens is not a commercially viable substitute to chick culling in conventional farming systems. In contrast, dual-purpose types had less breast meat but similar growth rates



Project member Dr. Isabelle Gangnat presenting the results at the World Food System Center Research Symposium 2017.

to slower-growing broiler-types (see figure). In comparison to fast-growing broilers, slower-growing chickens require four additional weeks to reach market weight, but they are used in Swiss organic farms because national regulations stipulate long fattening periods. Dual-purpose hens yielded 10% less eggs than high-yielding layer-types used in conventional and organic farming systems. A shift to low-protein diets, where soybeans are replaced by food industry by-products, caused a growth depression in all breeding types. However, this negative effect was lowest in dual-purpose types.

Results from a survey of Swiss consumers showed that only one in four consumers knew about chick culling. After learning about poultry production practices, however, consumers were receptive to dual-purpose products for their expected ethical value and eating quality. Those surveyed expressed their willingness to pay more for dual-purpose eggs, especially regular consumers of organic or free-range poultry products or those familiar with poultry production practices and dual-purpose products.

### Relevance to Stakeholders

Due to their growth performance, the use of dual-purpose types is not a viable alternative in conventional production systems unless chick culling is legally banned. In Switzerland, few people are aware of culling, and organic food consumers are willing to pay more for dual-purpose eggs. These products could thus possibly expand their

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Fisch

**Project Duration** 2014-2017

**Funding** WFSC Coop Research Program

**Food System Challenges Addressed** Sustainable  
proteins, sustainable livestock production,  
consumers' perception of sustainability

[www.worldfoodsystem.ethz.ch/research/research-programs/CRP/induce.html](http://www.worldfoodsystem.ethz.ch/research/research-programs/CRP/induce.html)



Figure: Carcasses of the chicken types. From left to right: layer-type, dual-purpose type Lohmann Dual, dual-purpose type Novogen Dual, and slower-growing type (Photo credit: Sabine Müller).

market share, if associated with an organic label and with information campaigns to increase consumers' knowledge about chicken farming practices.

### Selected Publications

Gangnat, I.D.M.; Mueller, S.; et al. [Swiss consumers' willingness to pay and attitudes regarding dual-purpose poultry and eggs](#). *Poultry Sci.* **2018**, 97 (3), 1089–1098.

Mueller, S.; Kreuzer, M.; et al. [Carcass and meat quality of dual-purpose chickens \(Lohmann Dual, Belgian Malines, Schweizerhuhn\) in comparison to broiler and layer chicken types](#). *Poultry Sci.* **2018**, 97 (9), 3325–3336.

### Media

Gangnat, I.D.M. [Fleisch essen oder nicht? Zukunftsblog ETH Zürich](#) [Online], **June 2016**.

World Food System Center. [ETH Zurich at Expo Milano 2015: Focus on WFSC Projects](#). Film presented at the EXPO 2015, Milan, Italy, **2015**.

Raaflaub, M. [Zweinutzungsrasse ist im Vorteil](#). *die grüne*, **November 2016**, 34–35.

The WFSC would like to thank the Coop Sustainability Fund and the ETH Zurich Foundation for supporting this project.