Untersuchungen zur Verbesserung des Wohlergehens von Legehennen beim Einfangen und Handling bei der Ausstallung *(Project 2.16.07)*

Michael J. Toscano, Centre for Proper Housing: Poultry and Rabbits, Division of Animal Welfare, VPH Institute, Vetsuisse Faculty, University of Bern, Burgerweg 22, 3052 Zollikofen

Key words
Laying hens, depopulation, injury, animal welfare, physiology

Aim of the study

Given the concerns for animal welfare and worker safety during depopulation of laying hens, our project sought to accomplish three overall objectives:

- Identification of key points and factors which result in: injury, increased bird stress, and other factors that lead to compromised bird welfare during conventional removal of end-of-lay hens from modern Swiss aviaries.
- Develop and evaluate cost-effective hen removal strategies that limit or circumvent the critical points identified in Objective 1.
- Assess hazards and refinement of processes from the perspective of the human collector to provide indirect benefits to bird welfare.

Material and methods

For two Experiments (A and B), a total of 15 and 13 farms, respectively, were visited over a two-year period for assessments of depopulation after arranging the visits with the producer. Experiment A was intended to establish an overall reference point of injury levels, hen stress measures, and characteristics of the process for future comparisons. For Experiment B, based on our own observations and discussions with producers, we developed two intervention strategies: blue lighting to aid vision during depopulation and carts for carrying the bird crates in the barn that reduced bird handling time. Each intervention was applied at the farm-level where half of the animals were depopulated in the standard manner and half by the intervention. Baseline samples were collected in the same manner as Experiment A.

For each experiment, we sought to select a wide range of housing systems and genetic lines, but were ultimately limited by logistics, e.g., conflicting schedules of depopulations. In each depopulation, two sets of data were collected, the first in the two hour period before depopulation to serve as a baseline and the second collection throughout the depopulation process. Collected data for both groups included: breathing rate, tonic immobility, blood, cloacal and comb temperature, and serum (Experiment 1 only) for subsequent analysis of blood corticosterone and creatinine kinase. Baseline hens were selected from various locations in the barn in a stratified manner to ensure a representative sample population.

During the depopulation itself, an entire crate of hens were selected immediately before loading onto the transport truck and brought to the area of the farm prepared for collections. Hens examined during depopulation were euthanized on farm using a lethal injection of a pentobarbital (Esconarkon 1.5mL/Kg; IP) and consequent cervical dislocation. Euthanized hens were transported to our laboratory facility after the depopulation where they were frozen at -4C for radiography to identify fractured bones, dislocations, and other injuries. Also during depopulation, we requested that two of the catchers wear head-mounted video cameras capable of infrared recording from which speed of bird handling, incidences of collision, and other events were catalogued.

Following each depopulation, the producers were asked to fill out a questionnaire regarding basic information concerning the flock, infrastructure and the depopulation procedure. Catchers were asked to fill out a separate questionnaire in order to evaluate their experience with depopulations as well as information on their physical condition.

Results and significance

Experiment A identified a number of bones that appeared to have been injured during the depopulation procedure with a total of 8% of hens affected and three hens with dislocated joints. The keel bone was the most affected (2.5%) followed by the pubis (2.2%) and wing bones (1%). During depopulation, the cloacal temperature was 0.5C ($p<0.05$) higher whereas the comb was 3°C lower ($p<0.05$), and chest movements decreased by 5 per minute ($p<0.05$) compared to the control. Creatine Kinase and corticosterone was 5.8% ($p=0.03$) and 16% ($p=0.04$) higher in depopulated hens suggesting tissue damage was occurring and the stress response was activated. Tonic immobility in the reference hens was more likely to require three inductions ($p=0.03$, $z=2.12$) or animals were unable to be immobilized ($p=0.02$, $z=2.3$). We found no differences between baseline and depopulation for hematocrit ($p=0.22$, mean ± SE=31.6% ± 0.2%). Latency to lift their head ($p=0.46$, mean ± SE=74.5s ± 5.4s) or stand ($p=0.5$, mean ± SE=117.1 ± 8.4s) during tonic immobility induction was not different between treatment. On average, depopulations took 101 min (± 6.6min) with a speed of 2.9 hens/min (± 0.26). Taken together the increased respiration rate and temperature changes indicate that hens were challenged by depopulation though the responses seemed to be within a normal range of the stress response and not severe.

Experiment B used two intervention strategies (blue lights, N=10; and carts, N=3) developed in consultation with the producers and manufactured by our technical staff. We were unable to detect differences between the intervention and control treatments for each response ($p > 0.3$). Although the lack of a treatment effect was unexpected, we believe the repeated use of many of the same producers in both experiments and the associated conversations may have affected our findings as their appeared to be less injuries in Experiment B.

Our findings were generally positive and suggested that though depopulation does involve animal injury and exposure to stress, the impact is within the range of other procedures that are commonly performed and considered permissible. Through extensive discussion with the producers and catching staff, we developed several suggestions to minimize damage and stress exposure including: adequate pre-depopulation discussions with all helpers and that the producer should be able to move between all positions during the depopulation to aid problems and ensure protocols are being followed.

Publications, posters and presentations

Gerpe, C., Stratmann, A., Gebhardt-Heinrich, S., Bruckmeier, R., and M.J. Toscano. Identification of injury rates and the stress response during depopulation of Swiss laying hen farms. *Publication expected November 2019.*

Gerpe, C., Stratmann, A., Gebhardt-Heinrich, S., Bruckmeier, R., and M.J. Toscano. Intervention strategies to reduce injuries and the stress response during depopulation of Swiss laying hen farms. *Publication expected January 2020.*

Gerpe, C., Stratmann, A., Gebhardt-Heinrich, S.,and M.J. Toscano. Evaluation of handling methods during a simulated depopulation of laying hens. *Publication expected March 2020.*

Gerpe C., Stratmann A., Toscano, M.J. 2018. Assessing the Welfare of end of lay hens during the catching and packing process of depopulation. Proceedings of the 15. European Poultry Conference. 17. – 21. September. Dubrovnik, Croatia.

Gerpe C., Stratmann A., Toscano, M.J. 2018. Assessing the Welfare of end of lay hens during the catching and packing process of depopulation. Lab meeting of cognition comparée and éco-éthologie University of Neuchâtel. 9th of November 2018, Switzerland.

Gerpe, C. Untersuchung zum Wohlergehen von Legehennen beim Einfangen und Handling während der Ausstallung. WPSA Tagung, Sektion Schweiz. Zollikofen, Schweiz. 01.03.2018.

Gerpe, Ch., Stratmann, A. and Toscano M.J. 2017. Assessment of animal welfare during the collection process of depopulation for end of lay hens. Poster presentation at the 7th International Conference on the Assessment of Animal Welfare at Farm and Group Level. September 5 – 8. Wageningen, Netherlands.

Gerpe , Ch. 2017. Wie steht es ums Tierwohl beim Ausstallen. Schweizer Geflügelzeitung, 11/17:12-13.

Gerpe, Ch. Untersuchung zum Wohlergehen von Legehennen beim Einfangen und Handling während der Ausstallung. Kommission für Stalleinrichtungen. 16.11.2017, Zollikofen, Schweiz.

Gerpe, Ch. Assessment of Animal Welfare during the collection process of depopulation for end of lay hens. Applied Ethology and Animal Welfare Seminar. 30.03.2017, Bern, Schweiz.

Project *2.16.07*
Project duration *January 2016 – June 2019*