
Effect of Light Spectrum and Intensity on Female Turkey Breeder Performance

A Data Management Plan created using DMP Assistant

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Project abstract:

The laying cycle of turkey breeders is short and characterized by a low peak. Therefore, to maximize production and prolong laying, the industry recommends managing breeder flocks under high light intensities. At a scientific level, the efficacy of high intensities on reproduction has not been demonstrated. High intensities may compromise welfare by increasing stress and aggression. Furthermore, while the use of spectrum LED lighting has grown across many sectors of the industry, its effectiveness in turkey breeders remains to be demonstrated. Specifically, red light was shown to accelerate sexual maturation and improve egg production in laying hens, broiler breeders, quail, ducks, and geese via deep brain photoreceptors. Therefore, our goal is to investigate the effects of two light sources (white / red spectrum LED) at two intensity levels to determine optimum parameters for turkey breeder welfare and performance, and provide producers with lighting options designed specifically for their needs.

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Data collection

Provide an overview of the data that will be generated, collected or acquired to support this project. If data will be acquired from a third party, specify the source.

The majority of data to be collected will be numeric with the exception of video observation of animal behaviour, which will then be converted into numeric equivalent. Data collection include body weights and growth, feed consumption, hormonal profiles, quantification of gene expression (mRNA levels), egg production, health parameters. Total size of the data collected (raw and processed) is anticipated to range between 5 and 10GB.

What method(s) of data collection will be employed?

Data will be either direct measurement such as body weight, feed consumption, egg production, or derived from analyses of blood hormonal profiles, gene expression of tissues of interest (mRNA quantification), and behavioural observation (video recordings).

What types of data will be included?

Numeric data

What software or digital formats will be used to collect, manage and analyze the data?

Microsoft Excel
SAS

Provide an indication of the scope of the data?

Body weight feed consumption and egg production will be performed weekly on 408 female Grandparent (GP) Hybrid Converter turkeys. Hormonal profiles will be performed as repeated measures analyses on 5 focal hens per pen (24 pens; 108 individual per sample time) at 22 and 28 weeks of age (baseline measurements), then weekly from 30 to 40 weeks of age (maturation and peak egg production), and every 2 weeks from 42 to 60 woa (remainder of the laying cycle). In total 21 sample dates, 108 samples per date, 2268 samples. Tissues will be collected from 6 hens per each treatment group (1 individual per pen, 24 hens total) at 20, 29, 30, 32, and 35 woa. mRNA levels will be analyzed using our NanoString multiplex system (up to 90 genes per sample). behaviour will be assessed using video cameras to record bird activity at 22, 30, and 36 weeks of age. The cameras will be positioned to capture the entire scope of the respective pen. At each timepoint, a total of 1 h of video footage will be analyzed per pen, with 0.5 h collected 1 h after the lights turn on, and 0.5 h collected 1 h before the lights turn off. In total, 6 h of video footage will be recorded per light treatment group per timepoint. From the recordings, all occurrences of mutually-exclusive agonistic interactions (aggressive peck, threat, chase, fight) will be counted. Each of these behaviours will be expressed as a frequency of occurrences per number of birds per hour. In addition, after the onset of lay, all hens will be assessed daily for broody behaviour. Furthermore, in order to assess impact of light quality on ocular health, eyes will be assessed weekly using a scoring system for blepharitis, an emerging pathology in the turkey breeder industry. A score of 0 = no abnormality; 1 = eyelid has moderate redness and swelling; 2 = eyelid has severe swelling (i.e., swollen shut), moderate to severe redness, and exudate may or may not be present, will be used.

Data storage

Estimate the size of data storage that will be required.

Between 5 and 10 GB

Where will your data be stored during the collection, collation and analysis phases of the project?

All data will be saved on the Animal Biosciences server

What backup strategy will be employed?

In addition to the Animal Biosciences servers which are automatically backed up daily, data will also be uploaded to a dedicated cloud storage space on OneDrive. Additional copies will also be maintained temporarily on the hard drive of laboratory desktops and laptops.

How will your data files be organized? What file naming conventions will you use? A brief overview or example would be adequate.

Folders will be created for the data in each phase: raw, cleaned, collated and final. Files within each folder will be named with a combination of descriptive title (type of measurement) and dates.

What metadata will be developed for your data? Will there be supplemental documentation prepared to assist with the interpretation and analysis of your data?

Each column in the spreadsheet will have a simple text heading. Further details on analyses (including statistical model) will also be included as text.

Data archiving and preservation

Will you deposit your data in the UG data repository or an external data repository? If you are opting to not archive your data in a repository, where will your data be housed after completion of your project?

Data will be hosted on the Animal Biosciences server.

Discuss any data transformations that will be needed so your data is preserved in appropriate, non-proprietary formats.

For long term preservation, all numerical data will be converted to text CSV format.

If some of your data will not be preserved, how long will you retain it? Will the non-preserved data be destroyed?

The raw data will be retained for a minimum of 5 years.

Sharing and reuse

Will the data that you archive in a data repository be made available for sharing and reuse by other researchers?

No

Explain which version of your data or subset of your data will be shared.

Raw and processed data will be shared upon request and review of the intended purpose.

When will your data be available for discovery by other researchers? Will you impose an embargo on publication of your data? If so, please provide details on the duration of the embargo.

As mentioned above, raw and processed data will be shared upon request and review of the intended purpose.

Will you limit who can access your data? If so, who will that be and why are you limiting the data's reuse?

Raw and processed data will be shared upon request and review of the intended purpose.

Are there specific license terms you will assign to users of your data?

No

Restrictions/limitations

Are there limitations or constraints on how you manage your data resulting from legal, ethical or intellectual property concerns?

This project involves multiple partners (Hybrid turkeys, CPRC, Thies Electrical, OMAFRA, NSERC) with individual intellectual property management requirements (detailed will be available in the executed contracts). However, to the best of our knowledge, no restriction regarding the use of data is in place.

Would your data need to be anonymized or de-identified before being shared with others?

No

Confidential information

What information do you want to include in your DMP that should not be publicly shared?

None

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