Centre of Expertise on Animal Disease Outbreaks

Report

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How can data collected by egg producers provide theoretical insights into poultry flock health and welfare?

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Key Message

Small- and medium-sized egg producers do not keep data in a format that would be easily modelled by EPIC. There are considerable advances in available technology that automate early identification of health and welfare problems in laying hen flocks, but at a cost.

Executive Summary

Small- and medium-sized enterprise (SME) egg producers gather extensive data on their flocks but do not have time or capacity to analyse it to look for trends/ patterns that might alert them to production, health or welfare problems. Most producers surveyed keep egg production records on paper, or a mixture of paper and on a database. For those producers that use a database (either transfer of paper records to database, or directly onto database), most use their own spreadsheets, which means that design, layout, and methods vary between producers. Meanwhile, there have been many developments in 'smart farming' technology. As a result, there are now several systems that producers can install in their poultry sheds to automatically track changes in poultry production, health and welfare. However, to the SME egg producer, cost of these systems may still be prohibitive.

Main Report

Between May and October 2025, EPIC conducted a survey of egg producers in the UK in order to understand what data egg producers collect and how it is stored. Egg producers routinely collect data as part of legal requirements (such as numbers of birds, date of placement, age at placement, useable area, mortality data, egg production, and feed information). In addition, accreditation schemes (e.g. RSPCA Assured, BEIC Lion Code, OF&G, etc.) may require further record keeping.

These data could potentially help producers keep track of the success of flocks and identify problem areas that they would want to avoid in the future. However, producers may have little time to analyse their own data. Moreover, some keep records on paper, which further complicates analysis. If records are kept electronically, it could be possible to design models (i.e., mathematical programmes that use one or more input variables to predict a response) to identify subtle changes in data (such as egg production changes, feed or water intake changes) and alert producers to potential problems earlier than they might notice themselves.

The information collected through the survey was intended to shed light on different data-holding practices and to determine how easy it might be to design early warning systems to alert SME producers, particularly, to potential health and welfare problems. The survey was shared via the Scottish Government Avian Registration Hub, on EPIC's website, and in an advertisement in The Ranger magazine (June 2025), which is circulated to over 400 egg producers.

This report is intended to be shared via the Scottish Government web page, the Avian Registration Hub, and on the EPIC website. A version will also be prepared for publication in the popular press (e.g. Poultry World).

Results:

Fourteen producers filled in the survey. These producers owned and/or managed a varied number of sheds (Figure 1).

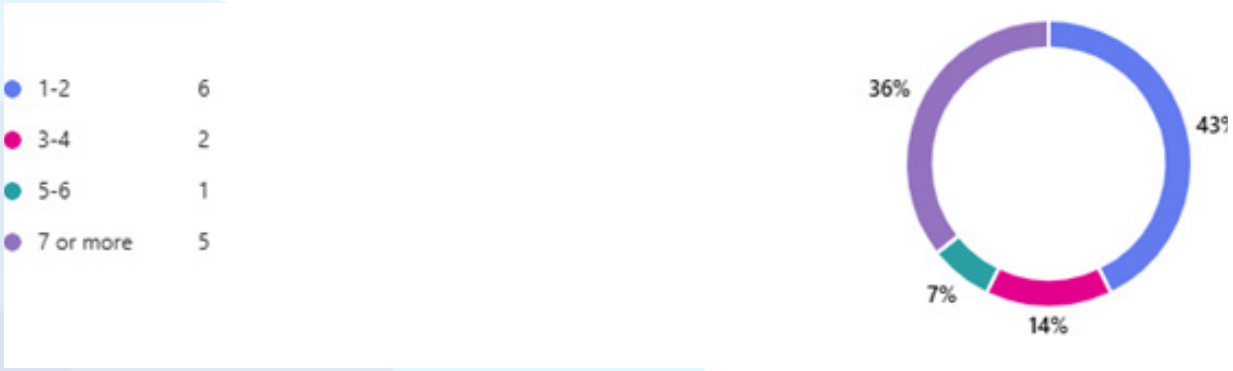

Figure 1. The number of laying hen sheds owned or managed by survey respondents.

Most egg production (74%) was from free-range systems, with 11% from organic or enriched cage ('colony') systems and 5% from barn systems.

Some respondents were interested in sharing data, if EPIC were to create models that would give producers early alerts to problems (Figure 2).

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Figure 2. Willingness to share data anonymously for further EPIC research into alert models.

However, most data are collected as paper records only, or as a mix of paper and a database (Figure 3). In fewer instances, data is collected onto paper and then transferred to a database. The types of data that producers were most likely to collect directly into a database were: egg grading information (23% of producers), shed humidity (25%), lighting programmes (24%), salmonella test records (31%), and veterinary treatments (23%).

The database most used (50% of responses) was a producer's own spreadsheet, which means that its design, layout, the data recorded, and the way it is collected are likely to differ from person to person. Two respondents use Eggbase (https://eggbase.co.uk/), two use another database, two use no database, and one did not answer. Currently, only two of these producers get an alert if data has changed (i.e. if egg production, or water intake, or feed intake, declines).

Figure 3. Survey responses to 'what format do you collect and keep the following information in?' Paper meant any written records, database meant data entered into a phone or tablet or computer which in turn is stored in a spreadsheet or remotely-managed data collection system

Recent advances

Increasingly, there are more computer-based systems that are contributing to egg production and hen welfare monitoring. A recent article in The Ranger magazine ("The layer superhighway: 1010100 ways artificial intelligence could drive the future of egg production" October 2025) summarised implementations of artificial

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intelligence (AI) used in Australia, Japan, China, France, USA, Canada, Thailand, and Israel to improve egg production systems. These include thermal imaging for heat stress; automated weighing platforms; robots that roll through the sheds to monitor patterns in bird movement, identify dead birds, and prevent floor eggs; environmental control optimisation; and optical + thermal imaging to identify changes in chicken behaviour, including indicators of disease and changes in feed use. There are also established academic groups that are focussing on the use of AI in precision poultry farming, such as at the University of Georgia, where they have developed a system to detect behaviours in loose-housed hens (YOLO) with high degrees of accuracy (over 88%), and identify dead chickens, floor eggs, and indicators of footpad health.

In the UK, there are at least two commercially-available systems for real-time bird welfare monitoring: BirdBox (FAI Farms, Oxford) and Pondus (Pondus Visionary Poultry, Stamford). BirdBox combines a wide range of data (automated weighing platforms, light, humidity, air quality, temperature, feed bin weight, water consumption, power use) to generate real-time graphs so that producers can instantly detect changes. More than 100 flocks are covered by the system currently, and it is used by the Lakes Free Range Egg Company (both on its own farms and those of its contracted producers). Pondus is a real-time, camera-based system to estimate bird size/weight, identify clustering and possible smothering events, and monitor feeder and drinker activity, as well as bird distribution. It relies on AI to notify producers of changes. Automated bird welfare monitoring systems come at an installation and maintenance cost; however, as technology advances these costs are likely to come down in future.

Since there are already many tech companies and research groups that are advanced in using data to identify health and welfare problems in laying hens, we have chosen not to pursue this line of work further under EPIC funding. Moreover, among SME egg producers in the UK, the limited information available suggests that most data are not kept in a suitable format to enable easy analysis and communication.

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