

An Overview of the UK Duck Industry AHVLA 110 AHW R9



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1. Executive Summary

The UK is the fourth largest duck meat producer in the EU. It also has a major role in the global duck meat market as it supplies genetic material to produce over 60% of the world duck meat total. The Pekin is the most popular breed of meat-producing duck in the world. It is thought that around 2 billion ducks a year are produced using GB Pekin stock. Their customer base covers over 80 countries and the vast majority of the EU Pekin duck industry uses UK breeding stock.

Defra monthly Poultry and Poultry Meat statistics show that UK production of duck meat in 2011 was 33,000 tonnes and has remained reasonably static in the last four years.

The market for duck meat and eggs is considered to be “niche.”, both in the UK and other Western countries. According to the British Poultry Council, duck meat accounts for only about 5% of the UK primary meat market. In 2011, poultrymeat, in total, accounted for 40% of the UK meat market, pig meat for 29%, beef and veal 24% and mutton and lamb 7%.

Kantar Worldpanel data suggests that the GB primary fresh poultry market is worth £2.2 billion per year. Within this, duck meat accounts for about £45m according to Nielsen data (less than 2%), but with duck volume growing 4.8% and value growing by 11.3% over the last year. Kantar also estimate the frozen duck market in GB to be worth £3 million per year (or 1.2% of the total frozen poultry market).

The UK imported over 6,000 tonnes of duck meat in 2009. This is mostly in the form of cooked meat from China and Thailand and is an ever-present threat to the sustainability of UK production. In the future, China is expected to become even more active in exports, especially with regard to cooked duck meat. Chinese duck meat production benefits from lower production costs, most notably through cheaper labour. The total production and processing cost of duck meat in China is around 53% of the EU cost.

The GB Poultry Register for 2011 indicates that, at any one time, there are nearly 6 million ducks in England, Scotland and Wales on registered holdings. Over 3 million of these are kept for meat production. There are some 8,700 premises, though only a small number of these are of a “commercial” size.

The vast majority of ducks commercially reared for human consumption are in the eastern counties of England. The production of duck eggs is mainly in the same areas, although there are some commercial scale holdings in western counties, particularly Gloucestershire, Devon and Cornwall.

The UK duck meat production sector includes two very large integrated producers, Cherry Valley and Gressingham Foods, who account for approximately 85% of the duck meat produced in the UK. Both of these companies are based in the east of England. In addition there are around

three other producers in England who are thought to produce up to 200,000 ducks a year and a growing number of very small producers rearing and selling ducks, often for direct sales to the final consumer – either at the farm gate or via internet selling.

The duck egg sector is dominated by three companies, Watercress Lane, Noble Foods and Stonegate producing around 95% of the UK's duck eggs.

The duck sector is covered by assurance and welfare schemes including:

- The Duck Assurance Scheme
- The Blue Duck Assurance Scheme
- RSPCA Freedom Food Standards

There is also the Defra Code of Recommendations for the Welfare of Ducks

However, voluntary schemes are mainly adopted only by the large duck meat and egg production companies and it is thought that many small-scale producers are unlikely to be members of assurance schemes.

Our discussions with key stakeholders in the duck sector suggest that the UK duck industry faces a number of potential threats which include:

- The threat to continued availability of cheap bedding materials, such as straw
- The increasing cost of duck feed which results in a weakening of the competitive position against imports
- Future competition from imports of cooked Chinese duck meat
- The cost and future availability (in the event of any climate change restrictions on water usage) of clean water for drinking/preening
- The cost of, and restrictions on, the disposal of dirty water from all intensive duck production systems
- The public perception of the safety of duck eggs and meat if there should be a food poisoning (or major avian disease) outbreak resulting from the largely un-regulated small-scale production sector
- Continuing questions over the welfare of intensively produced ducks

Larger duck meat and duck egg producers generally appear to operate to very high biosecurity, welfare and environmental standards. Specialist poultry vets with knowledge of the smaller, backyard production sector, suggest that biosecurity measures may be very much reduced in these systems.

On large-scale commercial farms common duck diseases can usually be prevented by good management and effective biosecurity. Control is often more difficult on small-scale farms.

All of the major duck meat and egg producers use the services of a specialist poultry vet or have an in-house veterinary capability. Smaller producers typically do not use the services of a specialist poultry vet, although some may

have input from general veterinary practitioners. Consequently, some duck disease issues could be missed and not properly treated, resulting in potential animal welfare issues or possibly contributing to the spread of poultry diseases.

Larger producers generally vaccinate breeding ducks and commercial egg laying ducks against *Salmonella*. However, discussions with the larger duck meat and duck egg production companies, and with specialist poultry vets, indicate that these practices are not widespread within the small-scale duck egg and meat production sectors. The larger companies would wish to see wider adoption of effective biosecurity and vaccination practices. This would help to support public perception that the whole Industry views protection of public health as being very important.

Section 18 of this report provides suggestions for consideration by Defra.

These include:

- A more effective way of identifying small units of less than 50 ducks where duck eggs and/or duck meat is being produced
- The use of “best before” dates and holding of production labelling on duck eggs to aid traceability
- A voluntary Code of Practice for duck egg production
- Encouraging vaccination of duck meat and egg laying breeding stock and commercial duck egg laying birds
- An awareness campaign aimed at improving biosecurity on small-scale production premises

2. Introduction

The Animal Health and Welfare Research Requirements Document 2012/13 states that *Salmonella* is estimated to cause over 44,000 human disease cases annually in GB. Duck products are becoming more important and more commonly associated with human disease outbreaks.

The results of the 2010 *Salmonella* National Control Programme sampling indicates that the prevalence of *Salmonella* in the UK poultry sector was well below the designated EU reduction targets for the breeding, layer and broiler chicken sectors and for the turkey sector for the regulated *Salmonella* serotypes. The duck meat and duck egg sectors are outside of the scope of the National Control Plans under EU Regulation (EC) No 2160/2003. In July 2010, the Health Protection Agency reported an excess isolation rate of pansusceptible *Salmonella* Typhimurium DT8 in England and Northern Ireland. By the end of October this amounted to 81 laboratory-confirmed human cases, an increase of 26% and 41% on 2009 and 2008 respectively. Descriptive epidemiological investigation found a strong association with consumption of duck eggs.

This finding was one of the main drivers for commissioning this report which investigates the current duck meat and duck egg sectors in the UK and provides a comprehensive reference document for Defra on how both sectors operate and the interactions between them at all stages of the production chain.

The study clarifies the types, numbers and sizes of duck farms within the UK and identifies areas of the industry and its practices that may aid the transmission of *Salmonella* or potentially other duck-harboured zoonoses to humans (Section 6). The study covers the structure and hierarchy of the UK duck meat and duck egg industries, including their breeding, hatchery and production methods (Sections 7 and 8). It differentiates between large, medium and small-scale producers and provides an understanding of the networks within and between them. Additionally, clarification of other livestock species associated with these production units, and the degree of interaction between them, is also included.

3. Background

The earliest reference to domestication of duck can be found in the archaeology of the Western Zhou Dynasty (1046-771 BC). Similarly, the archaeology of Egypt suggests that ducks have been an important source of food for many centuries. By the Middle Ages duck consumption was increasing in Europe, Asia and North Africa. But, the most important development in the recent history of duck production was the introduction of the Pekin (*Anas platyrhynchos domestica*) duck into the USA from China in 1873 which led to the Long Island breed being established in 1886.

By the 1950's, the Pekin duck breed had spread to many parts of the world (including Europe). Pekin duck production replaced the industry that was, in the UK, centred around duck production in Aylesbury, Buckinghamshire. The rise of the modern duck industry in the UK started in Lincolnshire in 1959 with the establishment of the Cherry Valley company. The company was founded by the late Sir Joseph Nickerson who produced the UK's first frozen oven ready duckling in the same year. A year later they launched their first range of frozen duckling products under the Cherry Valley brand. It is from that base that most of the Pekin breeding ducks (now referred to as Cherry Valley Ducks) are supplied to the world market. The vast majority (approximately 80%) of the European Pekin duck industry uses UK breeding stock.

Although the Pekin duck is the most economically important breed in the world today, other breeds such as the Barbary and the Mullard (a Barbary crossed with a Pekin) are produced in large numbers in France, China and Taiwan. In France, the Barbary and Mullard are grown primarily for the production of "Foie Gras." The breast fillet and leg meat are essentially the "by-product" of this production and are sold as "Magret" and "Confit" respectively.

The market for duck meat and eggs in the UK is considered to be "niche." According to the British Poultry Council, duck meat accounts for about 5% of the UK primary meat market. In 2011, poultrymeat, in total, accounted for 40% of the UK meat market, pig meat was 29%, beef and veal 24% and mutton and lamb 7%. This contrasts sharply with the importance of the duck meat and egg sector in Asia, and particularly China, where, for many years, it has served not only as an important source of protein, but as a more efficient means of farming the staple crop, rice.

Ducks are also very prolific egg layers which can "outperform" chickens in terms of the rate of egg production. Whilst Pekin ducks are used by the larger duck egg production companies in the UK, other breeds, including the Indian Runner and Khaki Campbell, are widely used by smaller-scale producers.

4. World, EU and UK Production of Duck Meat

World production of duck meat currently stands at approximately 3.8 million tonnes (see Table 1 below). Around 84% of duck meat comes from Asia, and within this area, China accounts for 2.6 million tonnes (83% of the Asian total). Production in China has increased by 4% per year over the last decade.

There is little interest in duck production in South America – the majority of the “Americas” total comes from North and Central America (84,000 tonnes). It has recently been announced that the state-owned Russian Agricultural Bank has allocated \$20 million to constructing a huge new fully-integrated duck production facility in Russia capable of producing 20,000 tonnes of duck meat per year from its 64 poultry houses.

Table 1 World production of duck meat 2009

	Thousand tonnes
Asia	3,194
Europe	451
Americas	99
WORLD TOTAL	3,815

Source: Poultry International

Consumption of duck meat in China is 2 kg per person per year, whilst in the EU it currently stands at 1 kg.

Production of duck meat in EU Member States in 2011 was approximately 491,000 tonnes according to DG Agri and AVEC. More than half of the duck meat produced in Europe (252,000 tonnes) comes from France. Other significant producers are Hungary (65,000 tonnes), Germany (61,000 tonnes) and the UK (30,000 tonnes).

The amount produced in the UK has reduced substantially since 2001. In 2006, UK duck meat production was 41,300 tonnes. In the period between 1996 and 2001, production had grown steadily from 37,900 tonnes to 47,600 tonnes. However, Defra monthly Poultry and Poultry Meat statistics show that UK production of duck meat in 2011 was 33,000 tonnes and has remained reasonably static in the last four years.

Hungary has increased duck meat production over the last four years, whilst production in France and Germany has remained reasonably static in the face of movements of cheaper meat from continental Europe and imports from Asia (in cooked form).

The UK's role in the global duck meat market should not be underestimated as it supplies genetic material to produce over 60% of the world duck meat total. Cherry Valley was awarded the Queen's Award for Export Achievement in 1984 and 1994 as they expanded their customer base to cover over 80 countries. The vast majority of the EU Pekin duck industry uses UK breeding stock.

Table 2 EU production of duck meat 2011

Country	Thousand tonnes
France	252
Hungary	65
Germany	61
UK	30
Bulgaria	18
Netherlands	17
Italy	14
Portugal	10
EU TOTAL	491

Source: DG Agri Expert Group Forecasts/AVEC

5. Imports and Exports of Duck Meat

The volumes of duck meat traded globally are small, at less than 133,000 tonnes a year, equivalent to just 3% of total world output. Europe is the most active region, accounting for more than half of the total traded. China is expected to become more active in exports, especially with regard to cooked duck meat. Due to lower costs (considered to be about 53% of the EU cost of production and processing), particularly labour, the Chinese product is cheaper than either the Thai or European equivalent, hence it is considered that these duck producers will face a major challenge from China in the years ahead. Interestingly, feed costs are slightly higher in China than in the UK. Furthermore, the Chinese are able to sell all the by-products of the processing operation (feet, tongues, head, neck, other internal organs etc) on the Chinese domestic market. In the EU, legislation restricts what products can be sold as fit for human consumption (with an associated disposal cost of these items) which gives the Chinese a large advantage when pricing duck for the export markets. Also, due to fears over ducks kept outdoors being a potential reservoir for Avian Influenza, the Chinese are pressing ahead with the intensification of their industry.

Table 3 Exports of fresh and frozen duck meat 2009

	Thousand tonnes
Europe (including trade between MS)	71
Asia	43
Americas	11
WORLD TOTAL	133

Source: Poultry International

The EU imported just over 54,000 tonnes of fresh and frozen duck meat in 2009. Germany was the largest EU importer with nearly 15,000 tonnes whilst the UK imported over 6,000 tonnes in the same period.

Imports are mostly in the form of cooked meat from China and Thailand, and are an ever-present threat to UK producers. Raw duck meat is regularly imported from France, Holland and Germany though the trade is cyclical with imports into the UK increasing when European producers have an excess of heavier bird stocks and/or favourable exchange rates. Imports from France are generally in the form of Magret fillets (a by-product of French foie gras production). Imports are generally seen in the Smithfield, Manchester and Glasgow wholesale markets.

Table 4 Imports of fresh and frozen duck meat 2009

	Thousand tonnes
Germany	15
UK	6
Czech Republic	6
Spain	4
EU TOTAL	54
WORLD TOTAL	149

Source: FAO

6. Structure of the UK Duck Industry - Overview

Keepers of poultry (including ducks) must register with the GB Poultry Register if they own, or are responsible for, a poultry premises with 50 or more birds. This applies even if the premises are only stocked for part of the year. Premises with fewer than 50 birds do not need to register, but Defra encourages keepers to do so voluntarily.

To keep the register up to date, keepers must notify Defra of any significant changes to information that has already been supplied. They should do this within one month of the changes happening.

The GB Poultry Register for 2011 indicates that, at any one time, there are nearly 6 million ducks in England, Scotland and Wales on registered holdings. These are kept on 8,700 premises.

The register provides the following breakdown of the different production systems for ducks:

- Breeding for shooting
- Breeding for egg laying
- Breeding for meat production
- Egg layers for human consumption
- Hatching premises
- Reared for meat production
- Reared for shooting
- Releasing for shooting
- Showing
- Other (see later)

Numbers of ducks-

As would be expected, there are more meat producing ducks (at over 3 million) on the Register than any other types of duck production (see Table 5). The Poultry Register gives a “snap-shot” of the numbers of birds on GB holdings at any one time. Given that commercial duck meat producers produce between five and six crops of ducks a year, the total number of meat ducks produced for the whole year can be assumed to be between 15 – 18 million.

A significant number of ducks on the Register (approximately 1.43 million) are kept by the shooting sector. These include ducks bred for shooting (60,000), ducks being reared for shooting (742,000) and ducks in the process of being released for shooting (633,000).

About 140,000 ducks are listed as egg layers for human consumption. A further 489,000 appear on the Register as breeding for either meat or egg laying production.

Nearly 18,000 ducks are listed on the Register for showing.

The “Other” category contains 698,000 ducks. The vast majority of ducks listed in this category are pets (ranging from 5 to 20 pet ducks kept per registration) but also include ducks producing eggs and meat for home consumption and for small-scale sales to the public. The category also includes ducks kept for conservation of rare breeds, showing, zoos and for tourists attractions. Also listed within this category are relatively large numbers of parent stock and pre-breeder ducks and two duck hatcheries.

The numbers of ducks listed on the Register is likely to slightly underestimate the number of ducks in GB at any given time as there is an exemption from completing the Register for producers with fewer than 50 birds. However, the number of ducks is probably only slightly more than stated as the exempt producers only keep small numbers of ducks.

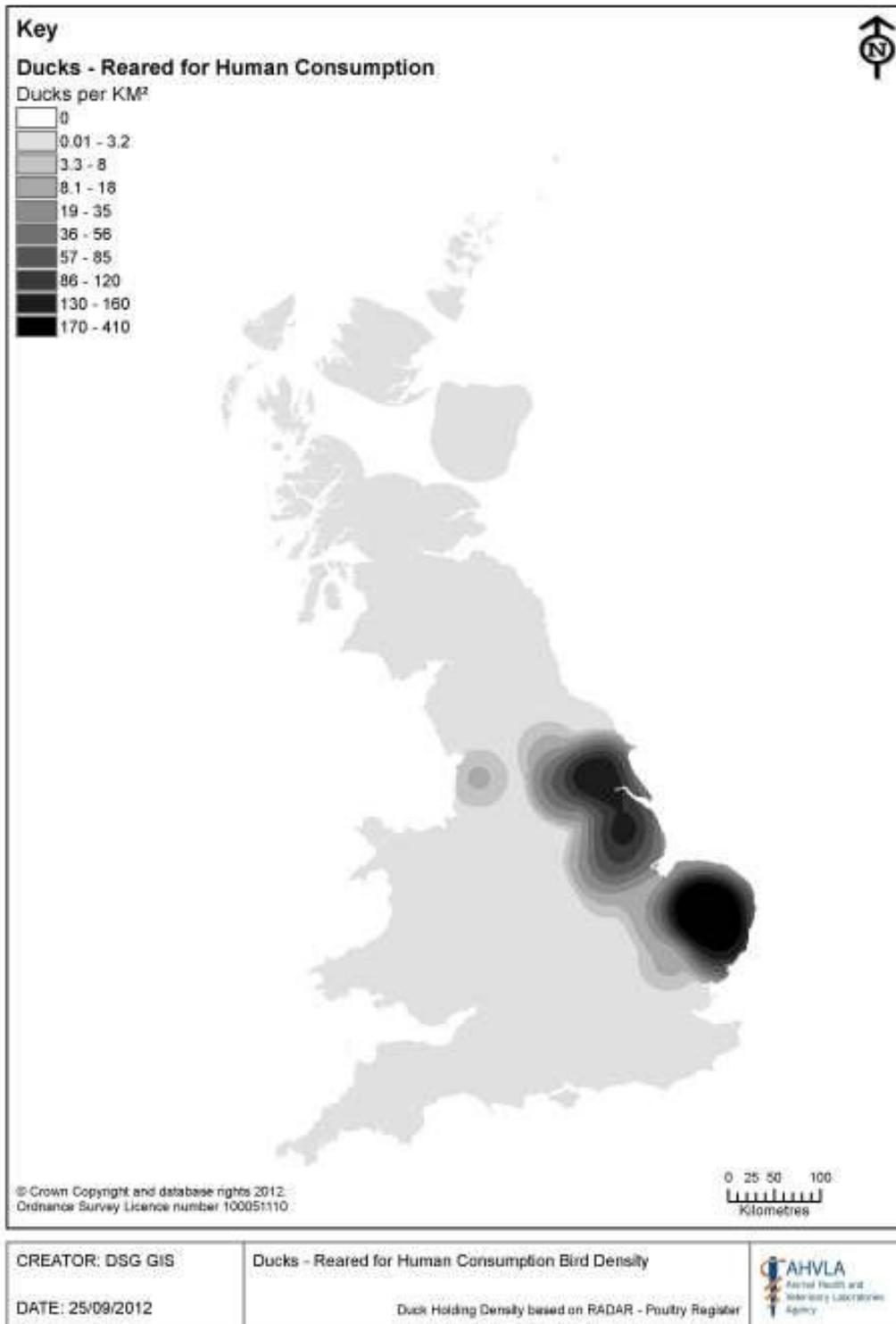
Table 5 Number of ducks in GB (rounded to nearest thousand)

Production type	Number (thousands)
Meat production	3,149
Rearing for shooting	742
Other	698
Releasing for shooting	633
Breeding for meat production	323
Breeding for egg laying production	166
Egg layers for human consumption	140
Breeding for shooting	60
Showing	18
Total	6 million approx.

Source: GB Poultry Register 2011

Virtually all of the duck meat producing birds are kept in England. The register shows that there are only 4,619 meat ducks in Wales (0.2% of the GB total) and 1,297 in Scotland (less than 0.1% of the GB total) – all of these are on small-scale production premises. As can be seen from Figure 1 below, the vast majority of ducks reared for human consumption are in the eastern counties of England.

Figure 1 – Ducks reared for human consumption – number of birds

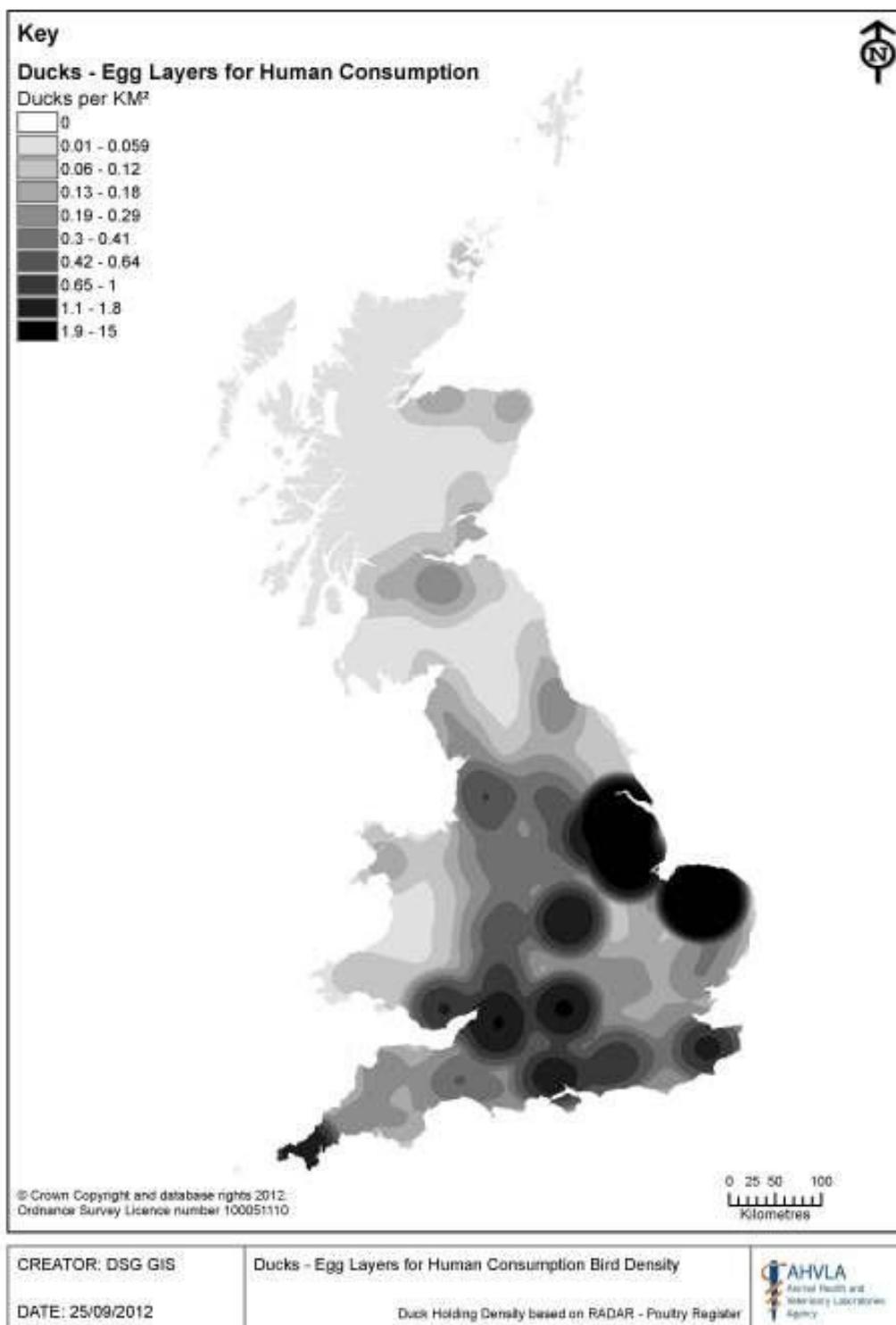


Source: GB Poultry register

Similarly, for egg layers for human consumption, the vast majority are kept in England 130,496 (93% of GB total). Scotland has 4,956 (about 4% of GB total) and Wales 4,539 (3% of GB total). It should be noted that that darker shaded areas on Figure 2 still have relatively small numbers of egg laying ducks,

unlike the large numbers of meat ducks shown in the darker shaded areas of Figure 1.

Figure 2 – Egg layers for human consumption – number of birds



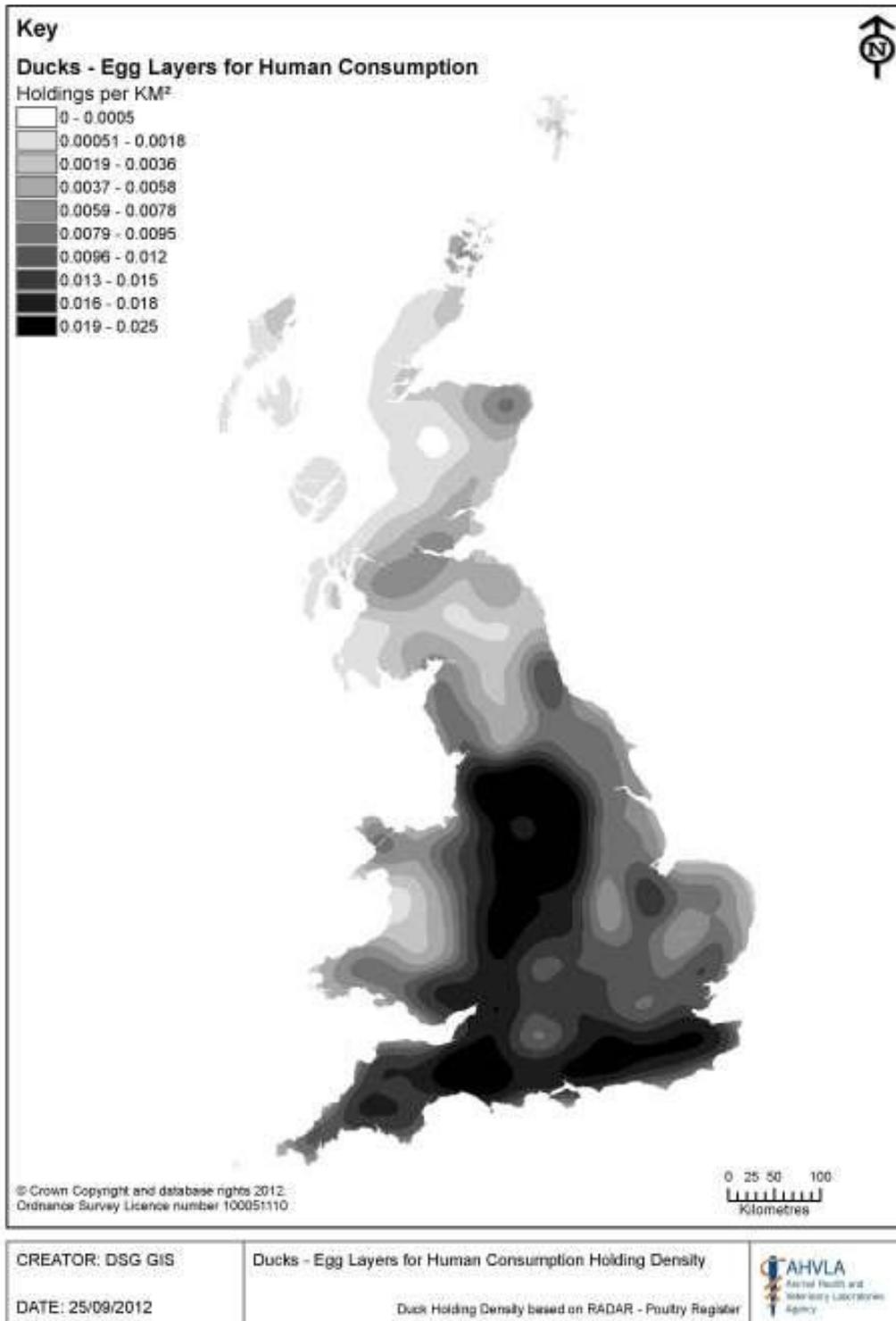
Source: GB Poultry register

A broadly similar split between numbers in England, Wales and Scotland exists for all of the other categories listed in the Register.

Number of duck premises-

Of the 8,700 premises listed with ducks on them, the largest number (2,600) is in the “other” category, whilst 2,300 have egg layers for human consumption. (In practice, there are likely to be more than 8,700 premises as those with less than 50 birds are exempt from the registration procedure).

Figure 3 - Egg layers for human consumption – numbers of holdings

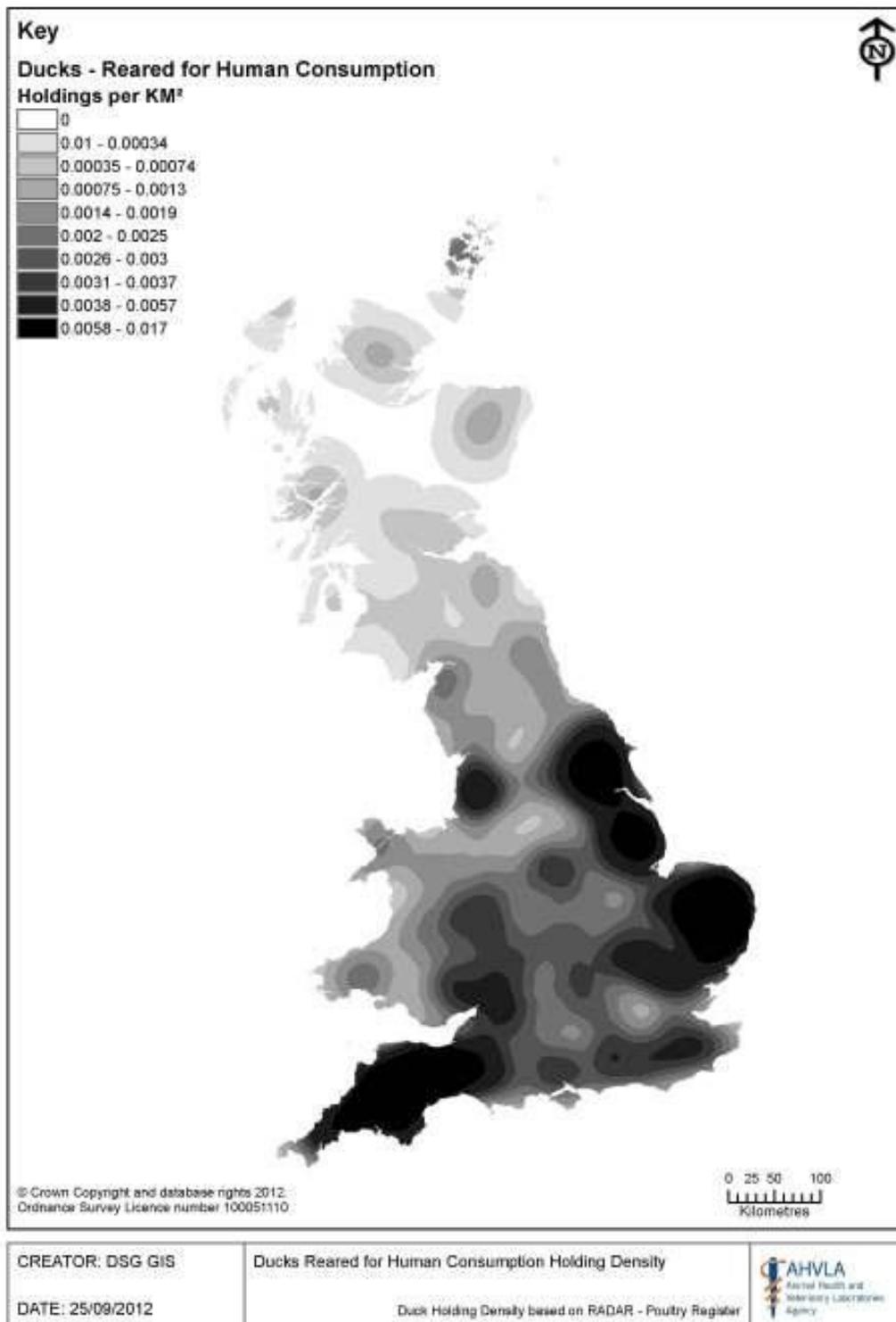


Source: GB Poultry register

Given that the majority of duck egg production comes from under 20 relatively large egg producing units, it can be concluded that there are around 2,000 very small duck egg producing farms.

The 3 million meat producing ducks are kept on only 620 premises (Table 6). From discussions with industry, our best estimate is that approximately 100 of these are large-scale premises (in excess of 10,000 ducks) producing for one of the two major companies and the remainder are comparatively small-scale operators, many of whom are likely to also be involved in small-scale processing. Units with more than 40,000 birds are required to be registered with the Environment Agency under the Environmental Permitting Regulations (formerly the Integrated Pollution Prevention Control (IPPC) regulations). Whilst EPR permits only record whether the holding is a poultry or pig holding, the Environment Agency indicate that there are likely to be approximately 14 duck farms with more than 40,000 ducks and therefore subject to EPR controls. From previous sections it can be seen that the largest producers produce (on their own account or through contract production) the majority of ducks in the country.

Figure 4 – Ducks reared for human consumption – numbers of holdings



Source: GB Poultry register

Table 6 Number of premises with ducks in GB (rounded to nearest ten)

Production type	Number of premises
Other	2,570
Egg layers for human consumption	2,280
Releasing for shooting	1,140
Breeding for egg laying production	750
Reared for meat production	620
Showing	530
Rearing for shooting	520
Breeding for meat production	220
Breeding for shooting	107
TOTAL	8,715

Source: GB Poultry Register 2011

As with the numbers of ducks, the vast majority of premises with ducks on them are in England (83% of the 8,715 premises). For each of the different production categories, there is roughly an 80:10:10 split between England, Scotland and Wales.

In Northern Ireland, duck keeper information was initially captured following the introduction of avian influenza legislation which required all birds to be registered. The majority of duck keepers are classified as non-commercial or rare breed producers, keeping ducks for showing or as a backyard flock, usually along with some chickens and/or geese.

The following table shows the number of flocks of ducks in Northern Ireland for a range of different flock sizes.

Table 7 Breakdown of duck production in Northern Ireland

Number of ducks	Number of flocks
< 50 birds	1025
50-100 birds	46
101-500 birds	36
> 500 birds	13
TOTAL	1120

Source: DARDNI personal communication

It is understood that the largest 13 flocks in Northern Ireland represent a total of around 170,000 ducks. If a mid point is taken of the number of ducks for each of the flock size categories in Table 7 (excluding >500 birds) and multiply by the number of flocks in each category, this equates to an additional 38,000 ducks, giving an estimated total of approximately 208,000 ducks in Northern Ireland. (If each of the flocks kept the maximum number of ducks in each of the categories above, the total would increase to 244,000). For comparison, this is about 4% of the numbers kept in GB.

7. Commercial Production of Duck Meat

7.1 Structure of the Industry

The UK duck meat production sector includes two very large integrated producers who account for around 85% of the duck meat produced in the UK. In addition there are three other producers in England who are thought to produce up to 200,000 ducks a year and a growing number of very small producers rearing and selling ducks, often for direct sales to the final consumer – either at the farm gate or via internet selling. Whilst the leading two companies are large in terms of duck production, the total number of ducks they produce is many times fewer than the 950 millions of chickens produced each year by the UK broiler companies.

Unlike the UK broiler companies who generally have parent stock and commercial birds (with primary breeding companies looking after the genetics), the duck sector has a higher level of integration with the main companies having pedigree and/or grandparent flocks as well. This level of integration provides a massive benefit in terms of biosecurity for the sector and the individual company as any issues can be dealt with at source and more rapidly than within a less integrated industry.

7.2 Description of Production Systems –

7.2.1 Breeding flocks for duck meat production-

Day old breeders are reared in separate rearing farms until about 16 weeks of age, when they are moved to the laying farm. Point of lay is around 25 weeks of age. Breeder farms have very high standards of biosecurity. Often there is restricted access to the site with essential visitors and staff having to shower before entering the site. Breeder houses are usually straw floored with nest boxes above the litter. The buildings used generally have forced ventilation “Harlow” type (timber clad) buildings which can be easily cleaned at depopulation time. Straw is used in the nest boxes as ducks like to lay their eggs on straw. The use of liberal quantities of straw in nest boxes makes mechanisation of egg collection very difficult, so eggs are collected by hand. Water is provided via nipple drinkers with open water troughs on the slatted area or bell drinkers. Feed can be delivered by a spinner onto the straw.

Breeding birds for meat production are generally kept at about 15 kg per m². They are kept in the ratio of about one male to five females and lay up to 280 - 290 eggs in a 52 week laying period (or around 220 eggs per duck housed at 45 weeks of lay). In contrast, a broiler breeder female produces 175 eggs in a 45 week period. Peak lay is reached at around 32 weeks of age. The meat from end-of-lay breeding birds is processed for specific catering/prepared food markets.

Eggs collected from breeding birds are washed and sanitised on farm and may have the waxy cuticle removed, with a sodium hypochlorite solution, to aid hatchability. (Some eggs are fogged with a sanitising product on the day of lay and again when they enter the hatchery). From there, the eggs are

transported to hatchery. Eggs are placed in the setter for 24 days before being placed into the hatcher for the next four days, giving a hatch cycle of 28 days (compared with 21 days in the case of broilers). Hatchability of ducks and broilers is very similar with an average commercial flock achieving between 80% and 84% of all eggs set. After hatching, day old ducklings are transported to the growing farms. Generally, day olds are transported in boxes of 100 ducklings.

7.2.2 Duck meat production-

Whilst there are a number of different production systems for meat producing ducks, the houses used for meat production are more akin to those found in commercial broiler production than those seen in duck egg production systems. The vast majority of duck meat is produced in the UK in indoor systems – very little of the total amount produced (probably around 2%) comes from free range systems due to pasture management and bird health problems.

Meat ducks need a fairly constant temperature and good environmental control. The thermoneutral zone of duck metabolism ranges between 10 and 23°C. Below this level, ducks require heating (in the form of LPG or similar) and above that level they are seeking to dissipate energy to cool. Many of the buildings used are naturally ventilated, fully enclosed “Harlow” type houses, but others have forced ventilation (particularly found in the more modern buildings). Some ducks are grown in barns with “Yorkshire” boarding sides. There is an increasing trend for buildings to have windows to provide natural daylight and farms that are producing their own renewable energy from wind or solar power.

Floors are normally of concrete but in some older housing systems, chalk or earth floors may still be used. Since water use is high, most houses have floors which gently slope and incorporate one or more drainage channels which continually allow water to drain away from the bird area. The channel typically runs from one gable end of the house to the other, either beneath the litter or beneath a raised slatted floor area. Houses should have good storage facilities for dirty water.

Wood shavings are generally used as litter only for very young birds early in the brooding phase. Thereafter, long chop straw (or, in some, cases short chop straw) is used throughout the industry as a litter material. Approximately 4 tonnes of litter is needed for 1,000 ducks in commercial meat production.

The litter is topped up on a daily basis as the birds grow, which requires a significant additional labour requirement compared to broiler chicken production. Because of the large quantities of straw used, the high moisture content and the relatively low house temperatures, the litter does not become composted to any noticeable degree whilst it is within the house. In contrast to the appearance and composition of a typical broiler litter, used duck litter looks like traditional farmyard manure. Analyses undertaken by ADAS in the past suggest that the nitrogen content in used meat duck litter is approximately 7 kg per tonne (fresh weight), depending on the moisture content (the figures for duck egg laying and breeding would be much lower)

compared with 27 kg per tonne for turkey litter and 33 kg per tonne for broiler litter.

Water is provided to satisfy the requirements for consumption and also to satisfy the duck's behavioural and welfare needs. A mixture of nipple drinkers, turkey "Plasson" bell-type drinkers and drinking troughs can be found. Different drinking systems result in vastly different quantities of water used in duck houses and the consequent problems of disposing of dirty water. Ducks drink around 10-12 litres of water in their lifetime and spill/"waste" up to a further 40 litres depending on the type of water system used. In comparison, a 2.5 kg broiler chicken drinks between 7 to 8 litres of water with minimal spillage. Based on the total number of ducks produced per year, the total water usage in the sector could be between 200 to 800 million litres. Most new units are built with a waste water treatment plant which adds significant additional cost.

When day old ducks arrive on the growing farm they are brooded for about 10 -14 days (at lower brooding temperatures than broilers). Brooding can either be whole house or part house. Feed is generally provided automatically, *ad lib*, in large feeding troughs. Pan and tube feeders can also be found on a small number of farms. Ducks prefer pelleted feed to mash. The pelleted feed must be of maximum possible durability – the more fines, meal not formed into a pellet, or resulting from pellet breakdown, that are present in the feed, the poorer the growth and feed conversion will be.

Modern Pekin duck breeds have a feed conversion ratio (FCR) of around 2.1 to 1 to produce a 3.25 kg liveweight bird. (Twenty years ago the FCR was 2.6 to 1 to produce a bird of the same weight and breeding programmes over this period have focussed on this important trait). An average growth rate is around 70 grammes per day. The stocking density is about 17 - 20 kg per m² and ducks are reared until about 35-52 days of age (depending on market requirements) to produce ducks in the range of 3.0 kg to 4.0 kg liveweight. Thinning is sometimes undertaken – for example, a thin may take place at 39 days for lower weight birds for retail sale, with the remaining birds continuing until 50 days to produce birds for the catering trade. Most duck meat producers produce six crops per year. Typical loss levels (mortality and culls) are around 5% per crop.

Commercial ducklings are not generally vaccinated against *Salmonella* and other medications are not routinely given. The industry relies upon utilising healthy stock, quality feed and clean sites as opposed to vaccination and medication. No evidence of *Salmonella* vaccination in ducks being reared for meat production has been found during this study.

At depopulation, ducks are caught by hand and placed into modular systems for transport to the slaughterhouse. Unlike most other poultry, ducks are typically caught and lifted by their neck until the catcher can support the duck's weight with the other hand. Ducks should not be *carried* by their necks nor be caught and carried by their legs alone as they are fragile and prone to injury. At slaughter the birds undergo a series of health checks. Surplus

byproducts, such as feathers, tongues, feet and offal are often exported to Asia. Slaughterhouse rejects are often below 2%. Typically, a duck slaughtered at 44 days of age would yield a breast fillet of 525 grammes, legs of 400 grammes and skin and fat of 630 grammes. A broiler of the same age would yield approximately the same amount of meat from a carcass 500 grammes lighter.

The larger companies operating in the sector would use hot wax for dressing duck carcasses.

Many farms have an incinerator to dispose of dead and cull birds. Others store dead birds in lockable bins or chest freezers and use the services of a renderer to collect and process the birds.

Farms belonging to the integrated producers are generally single age sites which allows a period after depopulation when no ducks are on the site. Houses are thoroughly washed and disinfected between successive flocks. Drinkers and other equipment are dismantled and cleaned separately to the rest of the house – see Section 9 on Biosecurity.

Those duck meat producers in the 10,000 to 200,000 bird range generally operate fairly similar systems of duck production. For example, day old ducklings arrive at the farm from the hatchery and are placed on straw under gas brooders for the first few days and are fed on a low density diets free of antibiotics, coccidiostats and growth promoters with no vaccinations being given to the ducklings on farm. The birds reach maturity at seven to eight weeks of age and are slaughtered in purpose-built slaughterhouses on the farm. Whole, fresh, birds are available in 2 kg to 3 kg weights, or in breast/leg portions, and are available all year round. Both the straw and feed are either produced on the farm or sourced locally. Often, they operate muck for straw arrangements with local farms. Outdoor reared ducklings are brooded in specialist heated units until they are 28 days old when they are moved to free range arks. Reared in small flocks, they have daytime access to grassy paddocks.

7.3 Outlets for duck meat

UK consumption of duck meat is thought to be approximately 18-19 million birds a year. UK production is approximately 15-16 million birds and imports equate to about a further 3 million birds.

The UK fresh duck market is valued at £45 million and, last year, 7% of UK households ate duck at home, according to figures from data monitor, Nielsen.

Kantar Worldpanel data suggests that the GB primary fresh poultry market is worth £2.2 billion. Within this duck accounts for less than 2%, but with volume growing 4.8% and value growing by 11.3% over the last year. Kantar also estimate the frozen duck market in GB to be worth £3 million (or 1.2% of the total frozen poultry market).

Current (week commencing 22 October 2012) wholesale prices for fresh whole ducks are 270 pence per kg in Glasgow and 320 pence per kg in Smithfield. Frozen duck breasts in the Glasgow wholesale market are currently 992 pence per kg. Frozen whole ducks in the Liverpool wholesale market are currently 254 pence per kg.

The duck meat market can be segmented into retail, Chinese restaurants, general foodservice and manufacturing.

Retail comprises the major retailers, bakeries (for the sandwich trade) and butchers and is predominantly fresh meat. Chinese restaurants includes both eat in and takeaways and is virtually all frozen meat. General Foodservice includes restaurant and hotel groups and independent restaurants and is both frozen and frozen cooked meat. Manufacturing is split into ethnic cooked (Chinese restaurants) and local (bakery and ready meals).

Cherry Valley specialise in the sale of duck meat (frozen whole birds) to the Chinese catering market. Over half of their sales are to this sector with sales to retail, general food service and manufacture accounting for a further 20% of sales. The remainder is comprised of exports of duck feather and by-products.

Gressingham Foods concentrate primarily on supplying duck to the multiple retail trade. Other important outlets for Gressingham are foodservice, wholesale catering butchers, Chinese restaurants, manufacturing and the export of duck portions to the EU and by-products such as gizzards, tongues and feet to Asia.

The UK supply chain for duck meat can broadly be split into UK fresh, UK/EU frozen and Far East frozen. Within the last two categories, there are further sub-divisions into ethnic food service, local food service and retail. The precise chain will vary between the different sectors. For example, for UK/EU produced frozen duck meat for retail sale, supplies are delivered from the factory gate to the supermarket regional distribution centre and then on the supermarket branch. About 50% of the duck meat produced is sold retail and the remaining 50% is wholesale/foodservice.

8. Commercial production of duck Eggs

8.1 Structure of industry

The duck egg production sector is very polarised with the three main producers, Watercress Lane, Noble Foods and Stonegate producing around 95% of the duck eggs produced in England. Watercress and Noble have similar numbers of ducks laying eggs for eating whilst Stonegate has approximately half the number of laying ducks of the other two companies. In total, the three companies have less than 100,000 egg laying ducks.

There are also a handful of significantly sized duck egg producers in Wales, Scotland and Northern Ireland. It is thought that there are hundreds of very small scale/backyard producers of duck eggs, often keeping a small number of ducks to produce eggs for home consumption, farm gate sales, sales at farmers markets etc.

It has been noted by one of the packers that a large number of surplus hatching eggs are released into the market by the meat hatcheries. They would estimate the number to be around 100,000 dozen per year.

8.2 Production systems – breeding and laying – eggs for human consumption

Duck egg parent stock and commercial duck egg laying stock are generally housed and managed in very similar conditions. Day olds are housed in large, part open, naturally ventilated straw-bedded barns (although some mobile units can be found on laying farms) with a low stocking density (around 15 kg per m²) with a managed lighting programme being required. Over half of the commercial egg laying ducks are kept in systems where the birds have access to outdoor ranging areas. Breeding ducks and commercial egg laying ducks are vaccinated against *Salmonella* (via water and/or injection) before they reach 18 weeks of age. Companies will use different vaccination strategies depending upon their own preferences and veterinary advice. This may involve a combination of live and killed vaccines. After 18 weeks of age the ducks are moved from their rearing quarters to their laying accommodation. Breeding birds are often housed in flocks of around 300 with five females to each male.

A carefully regulated feed intake ensures birds reach an optimum 1.8 kg at 18 weeks of age. Thereafter birds are fed *ad lib* until peak production. The value of a POL duck is currently around £16, including *Salmonella* vaccinations. Birds come into lay at 20-22 weeks of age and peak lay is reached at 24-27 weeks of age. The breeding birds lay for around 52 weeks before shell quality drops to a level that causes loss of hatchability, but commercial laying ducks can lay until around 85 weeks – as long as production is above 50% they are economically viable. Sometimes the ducks lay for 26 weeks, are rested, then start to lay again. Approximately 300 eggs can be expected per female each year.

Ducks are not generally induced into a forced moult. However, a moult may very occasionally be used by some companies when there is a glut of eggs on the market.

The cost of duck feed is a major issue for the sector. Laying ducks eat about 185 grams of feed a day which is 50% more feed than a commercial laying hen consumes. Furthermore, all feed has to be pelleted which adds an additional cost of about £4-£5 per tonne. The need for a high (typically 18.5%) protein content in the feed also increases cost.

Birds lay their eggs in open fronted nest boxes and eggs are collected by hand. This is a highly labour intensive operation. Three employees are needed to hand collect and wash the eggs of 7,000 layers. Birds are strawed down three times a week with fresh barley straw. Where water troughs are used, they are often situated over a slatted area with drainage channel for central collection of waste water and are emptied every morning to ensure that they remain clean. Troughs are generally placed well away from the nest boxes.

The duck manure (FYM) is removed at the end of the laying cycle and generally disposed of on neighbouring farms where “manure for straw” arrangements exist. There is often a two week turn around between flocks during which the buildings are washed and disinfected.

At the end of lay, a small number of birds are re-housed with smallholders, the majority are sent for further processing to remove meat for other uses, whilst others are culled without entering the human food chain.

Whilst larger duck egg producers vaccinate their laying stock against *Salmonella*, it is thought that many smaller producers do not do so. The larger companies would wish to see wider adoption of effective biosecurity and vaccination practices. This would help to support public perception that the whole Industry views protection of public health as being very important. The view has been expressed from several commercial duck egg producers that efforts should be undertaken to encourage smaller breeders to vaccinate their breeding birds against *Salmonella*.

8.3 Outlets for duck eggs

Retail-

In early summer 2012 Waitrose reported that volume sales of duck eggs had increased by 72 per cent year on year. They said that it was an upward trend which started earlier in the year (as a result probably of celebrity chef endorsement) and looked set to continue. However, others in the duck egg production sector are less certain that this trend will continue and some are predicting a reduction in sales as the recession continues and consumers reduce their spend on “luxury” items.

Duck Eggs from Waitrose cost £2.15 for a pack of six Clarence Court Gladys May's Braddock White Duck Eggs. Posh Birds duck eggs from Noble Foods

are available in Tesco and also retail for £2.15 for six, although they are currently (October 2012) on offer for £4 for two packs of six eggs.

Due to the high costs of production associated with duck egg production (for example, higher feed and labour requirements) duck eggs currently retail for 36 pence each in Tesco. In the same supermarket, organic chicken eggs are 31 pence each, free range chicken eggs are 21 pence each and value (enriched cage) eggs are only 11 pence each.

Watercress Lane sell pre-packs of six Blue Duck brand eggs to local stores.

The British Retail Consortium were contacted for their views on the practice of washing of eggs (in the context of a ban on washing of Class A chicken eggs) and not marking duck eggs with best before dates/dates of lay or other traceability indicators. The BRC were also asked about whether their members have standard specifications/protocols for production/sale of duck eggs and if there any regional differences in the numbers of duck eggs sold.

In response, the BRC stated that they have never discussed duck eggs with their members as it is such a niche market and suggested that these questions should be posed to the duck egg producers themselves.

Wholesale-

Duck eggs can be found at wholesale markets, particularly Smithfield Market in London and Glasgow wholesale market.

Catering-

Eggs entering the catering trade generally come from the larger duck egg producers and may be sold on keyes trays rather than in pre-packs.

Chinese Restaurants –

Some duck eggs are supplied to China Town in London in the form of salted eggs. These eggs are placed in brine for 30-40 days before being cooked and consumed.

Farmgate and Internet sales-

These sales tend to be from the smaller producers of duck eggs and may be combined with advertising of other products from the farm such as chicken eggs etc.

Butchers shops-

Duck eggs sold from butchers shops are generally from the smaller scale producers although larger producers do sometimes sell into this market.

9. Biosecurity

The majority of the information in this section has been obtained from face to face discussions with a number of stakeholders in the duck meat and egg sectors. These stakeholders include the agricultural/production managers of the main companies operating in the sector and their veterinary advisers. In addition visits were made to a selection of premises (both meat and eggs) to see, at first hand, the standards that were operating. Anecdotal evidence of standards operating in other parts of the sector was also obtained from these stakeholders and the industry representative bodies.

In general, it appears that the larger duck meat and duck egg producers operate to very high standards whilst for smaller, backyard production systems, biosecurity measures may be very much reduced or, in some cases, non-existent.

Larger producers will generally operate single age, single species sites. Often, smaller producers will have multi-age sites with other poultry or stock on the same unit, making sound biosecurity much more difficult to achieve.

For duck meat production, high health status “pedigree”/grandparent farms are generally situated many miles away from the main breeding and growing sites and typically have strictly controlled access to site. Often employees from other parts of the same company are excluded from the site to reduce the risk of bringing organisms onto the site. All inputs brought onto the site, and outputs from the site, are strictly controlled and monitored. Sites are generally securely fenced and any vehicles that need to enter the site are thoroughly cleaned and disinfected at the entry point to the site. Staff are required to shower into the site and wear site-dedicated clothing. Similar arrangements exist at the commercial hatchery and at breeding farm level. All farm buildings are thoroughly cleaned and disinfected at the end of the production cycle.

For duck egg production, due to the relatively small size of the sector, many of the stages of the production process often have to be undertaken on the same farm as it is not cost effective to have separate sites for grandparent, parent and laying stock. Generally biosecurity levels are good with, for example, vehicle washes on entry to the site, foot dips and dedicated boots for each house. The Duck Assurance Scheme (see later) specifies what biosecurity arrangements must be in place on members’ duck farms.

A typical routine cleaning and disinfection programme for a large commercial duck meat production farm is given below.

Following depopulation, solid manure is removed with a Bobcat/teleporter and tractors and trailers, and the house will be blown down to remove dust etc. All the surfaces will be soaked/pre-washed with a foam detergent (such as an alkaline long cling foam cleaner). Once dried, the house and equipment will then be disinfected with a suitable disinfectant (such as a gluteraldehyde and quaternary ammonium-based heavy duty disinfectant) applied with a lance or an orchard sprayer. The house may then undergo fogging with formaldehyde and possibly be treated for control of beetles.

There will be a terminal disinfection of water lines (perhaps with paracetic acid) and foot dips outside of the house and gatehouse will be changed twice per week (with maybe a peroxygen-based disinfectant). Wheel disinfection for vehicles visiting the site will generally be undertaken (again perhaps using a gluteraldehyde and quaternary ammonium-based heavy duty disinfectant).

10. Duck diseases

Ducks are generally robust and able to adapt to almost any environment. All of the major duck meat and egg producers use the services of a specialist poultry vet or have an in-house veterinary capability. It is thought that many smaller producers do not regularly use the services of a specialist poultry vet, and rely on input from general veterinary practitioners or go without. Consequently, some duck disease issues could be missed and not properly treated.

On large-scale commercial farms common duck diseases can usually be dealt with through good management, biosecurity and management. Control is more difficult on small-scale farms where these requirements are not in place.

There is a concern amongst some producers that a move to more extensive (outdoor) systems of production of ducks, with its attendant risks posed by wild birds and pests, will result in more disease challenges in the future.

There is very little antibiotic use in commercial duck production. In the duck meat sector, antibiotics are only used on rare occasions and under veterinary guidance for a specific health issue. Similarly, the use of antibiotics in the egg laying flock is rare. Occasionally birds in the rearing flock and day olds may be treated with antibiotics but this is a rare occurrence.

Once there is a problem, treatment can be difficult as there are few licensed products available for ducks. Using products under the “cascade” system results in a withdrawal period of 28 days for meat and 7 days for eggs.

10.1 Current diseases- 10.1.1

Zoonoses-

Salmonellosis, the clinical form of a *Salmonella* infection, is not usually seen in ducks although a wide range of serovars can be found in commercial ducks worldwide. Where it is seen, it is usually in birds up to two weeks of age. *Salmonella* Enteritidis and Typhimurium are not seen as a major issue by producers in the duck meat sector as they can be managed with strict biosecurity, water sanitisation, quality feed, pest control and vaccination, however they may occur in small-scale production systems where these practices may not be in place.

However, in July 2010, the Health Protection Agency reported an excess isolation rate of pan-susceptible *Salmonella* Typhimurium DT8 in England and Northern Ireland. By the end of October this amounted to 81 laboratory-confirmed human cases. Descriptive epidemiological investigation found a strong association with consumption of duck eggs (*Noble et al Epi Inf 2012*).

Chlamydia psittaci has been demonstrated in about 465 bird species. Birds living on sea shores, such as wild ducks are frequently infected and act as reservoirs for the disease. Transmission occurs from one infected bird to another susceptible bird in close proximity. The agent is excreted in faeces and nasal discharges. Vertical transmission has been demonstrated in ducks,

although the frequency appears to be low. *C. psittaci* can be introduced into commercial poultry through contact with the wild bird population, but contaminated feed or equipment can also be a source of infection. *C. psittaci* can survive in faeces and bedding for up to 30 days – cleaning and disinfection with most disinfectants can inactivate the organism.

Trembling, conjunctivitis, rhinitis and diarrhoea are observed in infected ducks and mortality ranges up to 30%. *C. psittaci* can infect humans, usually through inhalation of the organism when urine, respiratory secretions or dried faeces of infected birds are dispersed in the air as fine droplets or dust particles. Infected humans show signs of respiratory distress, but the disease is rarely fatal in properly treated patients with an early diagnosis.

Recently, the number of chlamydiosis outbreaks in ducks and in humans in contact with infected ducks has increased. In 2006, five severe cases of psittacosis were reported in France in individuals associated with eleven duck flocks on three farms. Other studies carried out in France suggest that chlamydial infections in duck breeding are very widespread. Also, an outbreak of chlamydiosis was investigated in workers at a duck farm and processing plant in Australia in 1989. *C. psittaci* was isolated from the ducks but there was little evidence of chlamydiosis in the ducks. Serological tests showed that 76% of workers had been exposed to infection.

Ducks can become infected with AI viruses, but experience has shown that they may not exhibit such a striking clinical picture as seen in other poultry species. They can therefore be regarded as potential reservoirs of the AI virus. Suspicion of infection with AI is legally notifiable in the UK. Ducks were involved in the H5N1 AI outbreak in Suffolk in November 2007. The infected premises comprised 5,000 growing turkeys, kept in 5 groups of 1,000, plus 1,118 ducks and 410 geese maintained under a free range system. Samples collected at slaughter for laboratory examination revealed that two groups of turkeys had a significant prevalence of infection (>50%), a further group had a maximum prevalence of 5%. No evidence of infection was found in the geese, but infection was detected in the ducks for which the maximum prevalence was 2%. Generally for AI, the route of infection is probably oral, initially, but possibly by the conjunctival or respiratory route. Transmission is by direct secretions from infected birds. In the future it will be interesting to see how climate change and its impact on wild bird migration patterns will influence the spread of AI or other diseases.

10.1.2 Other current diseases-

Two important viral diseases of ducks – Duck Virus Hepatitis (DVH) and Duck Virus Enteritis (DVE) - have been largely eliminated in Europe and can be controlled by vaccination in other parts of the World.

Ducks are sensitive to Aspergillosis, often caused by mouldy bedding material. The condition results in respiratory problems leading to relatively high mortality or poor performance. The condition can affect any age of bird although it is more commonly seen in young ducks. As there is no cure for the disease, good quality bedding has to be sourced as a preventative measure.

Ducks can be affected by bacterial infections such as *E.Coli*, *Pasteurella* or *Reimerella anatipestifer*, but these are rare in well managed systems. Where they do occur (in poorly managed systems) losses can be large. Free range production systems are generally more vulnerable to these infections than intensive systems.

Pasteurellosis or “fowl cholera” can occur in several different forms. Good sanitation practices, especially in and around standing water sources, coupled with good vermin control, are important in controlling the disease. Medication can be difficult and autogenous vaccines are being increasingly used.

Newcastle Disease is very rarely diagnosed in ducks. It is a possible cause of production drops and fertility problems. Suspicion of Newcastle Disease is legally notifiable.

10.1.3 Emerging diseases-

Baiyangdian flavivirus (BYD) (which is named after the region in China where the virus was first isolated) is a new virus that has not been reported in Europe yet, although it has been detected in China and south-east Asia. The virus causes severe egg drops and high mortality.

11. Threats for the duck sector

Production-

Litter-

The continued availability of suitable cheap bedding materials, primarily straw, is a potential problem as more straw is ploughed in or sent to power stations. Ducks do not perform well on large areas of slats, and where they are used, effluent disposal becomes a problem. To date, no suitable substitutes for straw have been found.

Feed-

The high cost of duck feed is a major issue for the duck sector, as it is for the remainder of the UK poultry sector. The situation is particularly acute for the duck egg laying sector. Egg laying ducks eat 50% more feed than a commercial laying hen consumes. Furthermore, all feed has to be pelleted which adds an additional cost of about £4-£5 per tonne. These additional costs of production place duck egg producers in a difficult competitive position compared to chicken egg producers.

Environment-

Duck production relies on large quantities of water being available for drinking and preening purposes. Given that duck meat production takes place primarily in those areas of the country where water resources are generally scarcer, any future climate change-related restrictions on water usage could impact severely on the industry.

Food Safety-

Commercial duck egg producers are concerned about the number of small producers selling eggs at the farm gate. They are often selling poor quality eggs with non-existent biosecurity, inadequate washing and no grading of eggs. The larger companies would wish to see wider adoption of effective biosecurity and vaccination practices. This would help to support public perception that the whole Industry views protection of public health as being very important.

Price and Image-

Duck eggs, and to a lesser extent duck meat, is seen as a luxury item and some in the industry have expressed concern that the recent recession has, and will continue to have, a negative impact on sales of duck products.

The layer duck is likely to remain dominant in extensive production systems where markets exist, but it is difficult to see that there will be sufficient genetic

improvements made in feed conversion to allow it to make significant inroads into commercial chicken egg markets.

Competition-

Competition from cooked Chinese duck meat is likely to intensify. When Thailand began exporting cooked meat a number of years ago the quality was poor. Since then, they have invested heavily in changing that perception and have built new farms and factories which comply with the highest health and welfare standards. Thai cooked duck meat is accepted everywhere in Europe now. The same is likely to happen with cooked Chinese duck meat. In order to stay competitive, the UK duck meat sector needs to focus on what it is best at, particularly the production of fresh duck meat.

Disease-

In 2007, a team from the University of Manchester were approached by Defra to produce an Avian Influenza model based on transmission by wind, wild animals, via delivery of feed, via slaughterhouse lorries and via company workers. The study revealed that the areas at most risk from Avian Influenza were East Anglia, Lincolnshire and South Yorkshire, largely due to the numbers of duck meat companies in these areas. The team believed that ducks were more likely to be implicated in outbreaks of Avian Influenza because ducks do not show signs of the disease as readily as other species of poultry and this could lead to a delay in the initial detection of the presence of AI infection.

Animal welfare-

The question of whether intensively produced ducks need water to bathe in has been around for a number of years. Animal welfare groups such as the RSPCA believe that ducks should be able to immerse their body into water and that ducks should be provided with facilities that allow full body access to water. The duck industry view is that this is unnecessary and impractical and any legislation introduced to enforce this requirement will add significant costs to the industry.

12. Representative bodies in the duck sector

The British Poultry Council-

The Duck Sector Group of the British Poultry Council represents duck farmers and integrated duck producers and processors, responsible for around 90% of British Duck meat sales. The Group's Technical Advisory Committee (TAC) oversees the Duck Assurance Scheme and the accompanying Quality Assured British Duck mark. The TAC comprises technical and farming directors of member companies (such as Cherry Valley and Gressingham Foods) and includes independent specialist poultry veterinarians and other advisers.

The National Farmers' Union-

The National Farmers' Union of England and Wales also has members who produce duck meat and eggs particularly where this production forms part of a wider farming business. The NFUs of Scotland and Ulster do not have any specific involvement with duck meat or duck egg production.

Other representation in the duck sector is through the groups and societies mentioned elsewhere in the report, such as the Game Farmers Association (for breeders of ducks to be released for shooting) and the Domestic Waterfowl Club of Great Britain (for breeders of ducks for showing and ornamental/utility purposes).

13. Assurance and welfare schemes

Duck Assurance Scheme-

Both of the largest commercial duck meat producers in the UK are members of the Duck Assurance Scheme. The Duck Assurance Scheme (DAS) was launched by the British Poultry Council in 2010, having been developed in collaboration with the country's leading duck meat producers. Very recently the DAS has been included within the Assured Food Standards Red Tractor Scheme. Under the new alliance, the BPC effectively owns the standards, but accredited producers can apply to Red Tractor Assurance to be able to use the well-known Red Tractor logo. Gressingham Foods has already taken this step and announced that it is to use the Red Tractor on its retail lines of Gressingham Duck.

The DAS is a UK voluntary scheme open to any facility/farm (breeder replacement, breeder layer, hatchery, commercial or free range farm plus any catching teams and hauliers) involved in the duck production process that can meet the requirements of the scheme. The Scheme is also open to producers of duck eggs for human consumption. In addition to their own internal audit systems, producers are independently assessed against the requirements of the Scheme.

The three largest duck egg producing companies will be joining the DAS for eggs for human consumption once the standards have been finalised. The standards cover only eggs for human consumption, not the processing of end of lay hens

Under the Scheme, each site must have a written health and welfare programme tailor-made to the needs of the farm, and must contain a strategy for the prevention and control of common diseases and be reviewed annually.

Parent stock (for production of commercial birds) and layer stock (for the production of eggs for human consumption) must be vaccinated with a licensed *Salmonella* Enteritidis and *Salmonella* Typhimurium vaccine. The Scheme also details *Salmonella* testing requirements. For day olds, samples must be tested from each house at 20-24 weeks and thereafter every 12 weeks. One sample should be taken two weeks prior to moving to the laying site or processing. For breeders and layers in lay, samples should be tested from each house at 20-24 weeks and thereafter every 12 weeks. For the hatchery, samples of 25g of hatcher fluff from each hatcher should be tested once every four weeks. Samples must be tested at an approved UKAS accredited laboratory.

Biosecurity requirements of the Scheme include: visitors' books, foot dips and barrier footwear systems, hand washing facilities, site-dedicated protective clothing; a period free of livestock between flock cycles and pest and rodent control. Specific requirements for cleaning and disinfection are also laid out.

The stocking density for breeding and laying ducks must not exceed 15kg/m² and must not exceed 25kg/m² for growing ducks.

The DAS also includes requirements for catching and transport, and lairage and slaughter.

Blue Duck quality assurance scheme-

This scheme has been developed by Watercress Lane for their own duck egg production and includes the stamping of eggs with dates and batch numbers to ensure traceability. The scheme requires the vaccination of every duck against *Salmonella* and eggs are tested every month and produced under a strict HACCP system. The eggs are washed and sanitised so that the waxy cuticle remains intact to protect against infection. It also requires rigorous animal welfare, biosecurity and environmental enrichment standards to be achieved.

RSPCA Welfare Standards for Domestic/Common Ducks-

The RSPCA Welfare Standards for Domestic/Common Ducks (November 2011) set out the Freedom Food eligibility requirements for ducks. The RSPCA claim that about one-third of ducks reared for meat in the UK comply with Freedom Food standards. Amongst the standards is a maximum permitted stocking density of 17 kg/m² with the practice of thinning being prohibited. Environmental enrichment and natural daylight is required for ducks housed indoors.

For ducks being sold as “free range,” the standards remind producers that there is a legal requirement for them to have had at least half of their lifetime with continuous daytime access to the range and that there is a minimum legal slaughter age for free range Pekin duck of 49 days. A written veterinary health and welfare plan must be drawn up, reviewed and updated at least annually with the attending vet. It is estimated that less than 5% of the ducks produced in the UK are reared in free range systems.

Producers are encouraged to seek designs of water facilities that fulfil the water related preening behaviours of ducks. It is this latter requirement that has brought the RSPCA into conflict with the BPC over the Duck Assurance Scheme. The RSPCA believe that ducks should be able to immerse their body into water and that ducks should be provided with facilities that allow full body access. The Duck Assurance Scheme rules state that water systems should be designed to allow water to cover the head and be taken up by the bill so that the duck can shake water over the body without difficulty. Where drinking water is provided by nipple drinkers, the Duck Assurance Scheme requires that additional bathing water must be provided and that troughs, wide-channel type bell drinkers, baths or showers are permissible to provide this. The RSPCA claims that wide-channel type bell drinkers do not allow full body access to water.

Code of Recommendations for the Welfare of Ducks-

The welfare of ducks is protected by the general requirements of the Welfare of Farmed Animals (England) (Amendment) Regulations 2010. There is also a Code of Recommendations for the Welfare of Ducks, which still continues to apply. The Code, *inter alia*, lays down maximum stocking rates for ducklings and ducks. On solid (littered) floors there is maximum stocking density of 36 ducklings (under 10 days of age) per m². This reduces to 14 ducklings per m² for ducklings that are 10 days to 3 weeks of age, and 7 ducklings per m² for birds over 3 weeks of age. A higher stocking density is permitted on slatted, perforated or metal mesh floors. Where grass runs are used there is a maximum of 2,500 ducks per hectare which can increase to 5,000 per hectare for “well-grassed runs.”

Code of Practice for Duck Table Egg Producers (Republic of Ireland)- Following concerns over *Salmonella* Enteritidis and *Salmonella* Typhimurium in duck eggs in 2010, the Department of Agriculture Fisheries and Food (DAFF) introduced their Code of Practice for Duck Table Egg Producers in August 2010. Whilst the Code specifically relates to egg production in the Republic of Ireland it is highlighted here as there are some duck eggs produced under the Code that are traded across the border into Northern Ireland. It also demonstrates the steps that the Republic have gone to, to tackle the problem of *Salmonella* in duck eggs. The Code sets out the general requirements for the rearing of point of lay ducks for the production of table eggs and the general requirements for production systems. All flocks must be registered with DAFF and issued with a unique producer code, which should be stamped on eggs to allow full traceability. An effective *Salmonella* monitoring programme must be in place and must comply with the minimum level recommended by DAFF – at day old, four weeks of age, at two weeks before moving to the laying unit, at 22 to 28 weeks and every 15 weeks during the laying phase. Sampling must be carried out in accordance with the relevant procedure and the analysis should be undertaken in a DAFF approved laboratory. However, the Code states that vaccination of ducks against *Salmonella* is a matter between the flock keeper and their vet.

The Code places a great deal of emphasis on good biosecurity to prevent the introduction or spread of disease into the flock. Interestingly, the Code states that “eggs must not be washed as washing renders them porous” and that packaging should include instructions to cook duck eggs thoroughly.

14. Ducks produced for shooting

Of the 19 million game birds and wildfowl shot for sport across the UK in 2004, about 970,000 (around 5% of the total) were ducks. Ducks can legally be shot (inland) in GB and NI between September 1 and January 31. Below the High Water Mark they can be shot between September 1 and February 20 in GB and between September 1 and January 31 in NI. The Wildlife and Countryside Act 1981 sets out which species of duck can be shot during the open season.

The Game Farmers' Association represents the interests of professional breeders of game birds (mostly pheasants and partridges) for the shooting sector. It is understood from an internal GFA study that only a small number of game farms (less than five) rear ducks. There are some game farms that are not members of the GFA and some of those are rearing ducks and a small proportion of shoots breed and rear their own ducks.

Typically, the Mallard are kept in 13m square breeding pens at a ratio of 40 females to 10 drakes and are fed on a mixture of oats, wheat and barley until the end of January when they are put on pre-breeder feed. Nipple bar drinkers are used to provide clean drinking water. Eggs are collected daily – usually by mid-afternoon – and are washed in rotamaids then placed onto setting trays which are then put through their egg washing machine to clean and sterilise the eggs and tray in one operation. High standards of biosecurity are practiced, for example, all traffic in the hatchery is one way (from clean areas to dirty areas). The hatchery only sets eggs from their own production and does not buy in eggs from other producers. Approximately 100,000 ducks are produced annually, with 85% being sold as day-olds and the remainder as 6-8 week old poults (this is the age when the ducks are independent and can go straight to the flight ponds).

Breeding ducks (and pheasants) are vaccinated against *Salmonella*. Routine monitoring is undertaken and it is understood that no *Salmonella* has been found in the ducks. Ducks are also vaccinated against Duck Virus Enteritis.

There are a very small number of other game farmers breeding Mallard ducks for shooting. Some shoots, particularly the smaller ones, breed small numbers of mallard themselves. It is understood that there are no imports of day old ducks or hatching eggs for shooting purposes.

In Northern Ireland, there are at least five estates that rear ducks for shooting. Three of these are based in County Down, one in County Tyrone and the other in County Armagh. The numbers of birds kept in these flocks range from 1,000 to 4,000 ducks.

No specific legislation regulates the breeding and rearing of birds for sporting purposes. In 2009, Defra published a Code of Practice for the Welfare of Gamebirds Reared for Sporting Purposes. The Code provides practical

guidance in relation to Section 9 of the Animal Welfare Act 2006 affecting birds bred and reared under controlled conditions for the purpose of release for sport shooting, together with birds retained for breeding purposes. The Code states, *inter alia*, that all game bird breeders and rearers should register with a veterinary practice in order to deal with any incidences of poor welfare, disease problems or injuries that require attention. The Code stresses the importance of good biosecurity and the necessity of devising, and annually renewing, a flock health and welfare plan in conjunction with their veterinary surgeon. Records should be kept for each flock and retained for three years to show, for example, origin of eggs, chicks, breeding stock and date of arrival, and the destination of day old chicks, eggs and young birds.

The British Association for Shooting and Conservation (BASC) has a Code of Practice of the proper use of flight ponds for waterfowl. A flight pond is an open area of fresh water or marsh used by wildfowl in the evening in order to feed. Flight ponds can therefore provide wildfowl shooting at dusk or as they leave the flight pond in the early morning. The wildfowl using such ponds may have been reared and released, or bred in the wild locally, or have travelled long distances to overwinter in the UK. Mallard are the most common species, but flight ponds can attract Teal and other species. The Wildlife and Countryside Act 1981 and the Wildlife (Northern Ireland) Order 1985 provide that Mallard eggs may be collected from the wild (under general licence) until March 31 in GB and until 10 April in NI. Collected eggs must be incubated and every effort made to rear the ducklings. They must be released into the wild by 31 July. The number of birds released must be appropriate to the size of the flight pond, so as not to damage the habitat or other wildlife. As a guide, when releasing Mallard, 600 birds per hectare of water is a maximum.

15. Smaller scale production of duck meat and eggs

There is anecdotal evidence of a growing number of smaller scale producers of duck meat and eggs. Often these are small businesses operating on a full or part time basis utilising family labour. These small scale producers, in some instances, use commercial breeds of meat and egg laying ducks, but often use speciality breeds too. Many have varied outlets for their produce and often use new advertising media, such as their own internet website to encourage sales.

A growing consumer demand for duck meat for Christmas is said to be one of the main reasons for the growth in small scale duck meat production. For a typical producer in this category, day old ducklings are bought in and reared over a 10 week period to produce a 2 kg to 2.5 kg bird. The ducks are fed a mixture of wheat and malted barley which is grown on the farm. After plucking the birds are immersed in hot wax which is later peeled off to remove any remaining feathers. The ducks are hung for two weeks to aid the maturing process. Outlets include farmers' markets, village shops, local pubs, restaurants and butchers shops. The selling price for their ducks is around £11 per bird. The longer growing period and the period of hanging after

slaughter are the key reasons why smaller producers need to charge more than commercial producers for the ducks they market. Other small scale producers direct selling over the internet are achieving anything from £5 per kg to £10 per kg for the ducks they produce.

16. Small-scale duck breeders

Practical Poultry magazine has a comprehensive list of small-scale breeders of poultry. Approximately 370 different breeders of poultry are listed in the directory. Whilst the majority specialise in chickens, 93 state that they breed/sell ducks. "Ducks" in this context includes the Pekin and Khaki Campbell strains of meat ducks and egg layers and also includes ornamental strains too.

The table below first gives a breakdown of the listed breeders by region of the UK and then by counties of England. Whilst there are duck breeders in all of the regions of the UK, England predominates with 71 small-scale duck breeders listed. Ducks are bred in virtually all counties of England with the east and south-eastern counties having the most small-scale breeders of ducks listed.

Table 8 Regional breakdown of small scale duck breeders

Region	Numbers of breeders
England	71
Scotland	12
Wales	7
Northern Ireland	3
TOTAL	93
County breakdown for England	
Norfolk/Suffolk/Essex	11
Kent/Sussex/Surrey/London	11
Dorset/Glos/Somerset/Avon	7
Devon/Cornwall	7
Cambs/Lincs	6
Notts/Derbys/Leics/Midlands	5
Worcs/Shrops/Staffs/Hereford	5
Lancashire/Cheshire	5
Beds/Bucks/Herts	3
Wilts/Hants/Berks	3
Cumbria	3
Yorkshire	3
Warks/Northants/Oxon	2
TOTAL - ENGLAND	71

Source: Practical Poultry Breeders Directory - October 2012

The table above indicates that there are at least three small-scale breeders of ducks in Northern Ireland. The Irish Fowl website also has a list of small-scale duck breeders. There are 146 entries listed, the vast majority of these are based in the Republic of Ireland and are small, or very small scale breeders,

often breeding ducks as a hobby rather than as a commercial enterprise. It can be expected, though, that some of these ducks bred in the Republic of Ireland could be sold across the border into Northern Ireland for backyard production of duck eggs, and possibly meat.

The selling price of ducks produced by these small scale breeders is understandably, proportionately higher than prices found in the commercial sector as they do not benefit from their economies of scale, however they are unlikely to be vaccinating against *Salmonella* so are saving costs there.

17. Ornamental uses and showing of ducks

There are two main organisations representing the interests of the growing number of people who keep ducks for ornamental or for showing purposes.

The British Waterfowl Association, based in Oxted, Surrey produces for members, three times a year, the “Waterfowl Magazine” containing practical advice, information and exchanges of views on keeping waterfowl. The Association also produces a breeders directory, holds open days and workshops and organises the National Waterfowl Exhibition. It holds local as well as regional and national events for members, provides help and advice to experienced keepers and newcomers to waterfowl keeping and hosts a website (www.waterfowl.org.uk). Where necessary, the Association will act nationally to support members’ interests. The membership fee is £25 per year.

The Domestic Waterfowl Club of Great Britain, based in Newbury, Berkshire, was established in 1996 “by breeders for breeders” with the main purpose being to provide help and assistance for the novice, junior or long term breeders alike. The Club mostly caters for the needs of those involved in showing waterfowl. Its aims are to promote the breeding, exhibition and enjoyment of pure bred waterfowl in both the competitive and hobbyist forms and to maintain breed standards. The Domestic Waterfowl Club website (www.domestic-waterfowl.co.uk) provides breed facts, pictures and information on where to buy quality pure bred ducks (and geese). For example, there are six breeders of Khaki Campbell ducks, six breeders of Pekin and eleven breeders of Muscovy ducks listed on their website. The Club has advised that most members would have under 50 waterfowl and would not interact at all with commercial duck meat or egg production or ducks reared for shooting. The website contains information on duck health and welfare and contains a link to the AI pages on the Defra website. The Club membership fee is £12 per year.

In total there are 33 duck breeds kept in the UK, with all but a few recently imported exotics being officially recognised as breeds and standardised by the Poultry Club of Great Britain - the parent body for all breeds of fowls, waterfowls and turkeys. There is no record of the stocks of different breeds held in any national sense and there is effectively no connection between the stocks held by breed organisation members and those stocks held by the commercial industry.

The Poultry Club of Great Britain’s main objective is to “promote high standards in the keeping and breeding of purebred poultry.” One of the ways it achieves this is through keeping up to date the book of British Poultry Standards. The Standards are a crucial tool in the preservation and conservation of pure poultry breeds. The Poultry Club of Great Britain also organises the National Show (where there over 6,000 exhibits of 135 breeds of poultry) and provides general biosecurity advice for keepers of free range poultry (including ducks). It suggests, for example, that waterfowl and

chickens should be kept separate and there is a link to the Defra AI website. Club membership is £24 per year.

18. Possible suggestions for further work

From visits to, and discussions with, a range of duck meat and egg producers in the UK it would appear that the large commercial and “medium” sized duck egg and meat producers are generally operating to high standards of health, welfare and biosecurity. This general view has been endorsed during numerous discussions held with specialist poultry vets (with knowledge of the duck sector) when evidence was being gathered for this report. Vaccination is practiced, where appropriate, to control the risks of diseases, particularly *Salmonella*, occurring. In the absence of specific legislation, the industry is imposing self-regulation to ensure that its integrity remains unimpeached and that current levels of sales are maintained.

However, there have been concerns expressed that small-scale production is by and large unregulated which provides opportunities for poor husbandry practice to occur. In contrast to the chicken table egg sector, there is no specific regulation covering the sale of duck eggs. Similarly, there is no Code of Practice in place to assist producers with the production of duck eggs in the UK. The Duck Assurance Scheme sets standards for the production of duck meat and eggs and has been adopted by the larger producers. However, smaller producers are not part of the scheme at the present time.

The inability to identify, and make effective contact with, the large number of small-scale (i.e. under 50 bird flocks) duck egg and meat producers hampers the ability of the authorities to raise awareness of disease issues and the practical steps that these producers can take to reduce the risks.

The following suggestions are made for Defra to consider in relation to the disease issues highlighted in this Report.

- 1) Identification of smaller producers (not currently on the GB Poultry Register) is helpful to ensure that the spread of avian disease, or human health problems associated with their production practices, can be restricted. As the GB poultry register has an exemption for those keeping fewer than 50 birds, Defra could therefore explore ways of identifying more small-scale producers by voluntary routes. For example, efforts could be undertaken to encourage as many currently exempt small-scale producers (keeping under 50 birds) to voluntarily register. A wide scale publicity exercise could be undertaken to encourage this.
- 2) The report has identified a number of potential risks associated with a lack of mandatory traceability of duck eggs. Marking individual duck eggs with the premises on which they were produced would aid traceability in the event of a disease or human health problem. Also, if

duck egg production were to be included within the EU Egg Marketing Regulations, this would introduce legally enforceable rules on size, weight and method of production descriptions (such as “free range”). However, it is recognised that a change to the current Egg Marketing Regulations is highly unlikely at the present time. Even if the Regulations were to be changed to include duck egg production, the current rules contain an exemption for those selling eggs at the farm gate, so the impact of bringing duck egg production within the remit of the Regulations may have only a modest impact.

- 3) Consideration should be given to introducing a Code of Practice for Duck Egg Production as the Republic of Ireland has done. Adherence to the provisions of the Code by all producers will help to ensure that duck eggs are produced to the highest standards possible and the risks of producing *Salmonella* contaminated eggs are substantially reduced.
- 4) Key stakeholders in the duck sector believe that the risks of *Salmonella* contamination can be substantially reduced by vaccination of all duck breeding birds (meat and eggs) and all ducks producing eggs for human consumption. It is widely believed that vaccination, combined with good biosecurity measures, is likely to lead to a reduction in *Salmonella* contamination. The importance of vaccination and good biosecurity procedures could be best communicated to producers through the publication of a Code of Practice for Duck Egg Production. Additionally, encouraging producers to join industry assurance schemes which have compulsory vaccination as part of their scheme requirements should be supported. Members of the Duck Assurance Scheme already comply with the scheme requirement for vaccination of breeding stock.
- 5) An awareness campaign and knowledge transfer activities based on improving standards of biosecurity on small-scale production units could facilitate *Salmonella* control across the whole duck industry

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