Farm Animal Welfare

THE CULLING OF MALE CHICKS

The culling of day-old male chicks from the egg industry raises an important ethical issue. While viable alternatives are explored, it is important to ensure that this process is carried out as humanely as possible.

In hatcheries, the sex of chicks is determined shortly after hatching. While healthy females are transferred to rearing farms, all males and unhealthy females are disposed of immediately. Unfortunately, unlike broilers (meat chickens) who have been specifically bred to grow larger breast muscles and legs, male chicks from the egg industry do not grow quickly enough for meat production and are therefore not economically viable. The culling of millions of male chicks per year is understandably upsetting. Although reports suggest that in the UK, most if not all of them are used as pet food, treats for dogs, or as food for reptiles, other zoo animals and birds of prey.

There is an important ethical issue relating to the chicks very short length of life, and there can also be welfare issues if the killing is not being carried out humanely.

Free stock image of a chick (credit: Surendra Basnet)

Scientists continue to explore alternative approaches to male chick culling through new technologies. While potential alternatives exist, further research and evidence are needed to assess their effectiveness and viability. It is, therefore, important from an animal welfare perspective, to ensure that the animals are handled humanely and killed by a method that does not cause suffering.

Current killing methods

The *Welfare of Animals (Slaughter or Killing) Regulations 1995* states that the killing of surplus chicks and embryos in hatchery waste (Schedule 11) can be achieved using either (a) a mechanical apparatus producing immediate death, (b) exposure to gas mixtures or (c) dislocation of the neck. For more detailed information about these methods, please visit the Humane Slaughter Association (HSA) website (www.hsa.org.uk).

GAS KILLING

It is our understanding that in the UK, all male chicks are currently being killed using argon gas. Chicks are either placed in pre-filled gas chambers or within an open chamber where the gas is added gradually. The law states that surplus chicks can be killed using: (a) an atmosphere with the highest obtainable concentration of carbon dioxide, supplied by a source of 100% carbon dioxide (b) a maximum of 2% oxygen by volume and 90% argon (or other inert gas) by volume in atmospheric air, or (c) 25% to 30% carbon dioxide by volume and 60% argon (or other inert gas) by volume in atmospheric air.

Unlike maceration (see below), gas killing does not result in the instant loss of consciousness; therefore, there is a potential for the chicks to suffer depending on the gas mixtures used. Although the use of 100% carbon dioxide is legal, it is not recommended by the

HSA as it is an acidic gas and is deemed to be highly aversive at concentrations above 25%. Argon and other inert gases such as nitrogen are the preferred gases for gas-killing, as they are nonaversive.

MACERATION

Maceration (Instantaneous Mechanical Destruction, IMD) is a method involving a mechanical apparatus that instantly kills the chicks using either rapidly rotating blades or a roller type device with solid projections resulting in the chicks being 'flattened'. Although the idea of using any of these apparatus to dispose of chicks can be distressing, maceration constitutes a humane method when managed and maintained correctly as it causes chicks to be killed instantly thus minimising chances of suffering.

NECK DISLOCATION

Dislocation of the neck must be accompanied by the severance of the spinal cord and blood vessels in the chick's neck, according to legislation. The HSA does not recommend neck dislocation without pre-stunning unless it is being used in an emergency.

Alternative methods

There are three potential alternatives to the killing of male chicks: (a) in-egg sex determination, (b) rearing chicks for meat, and (c) developing dual purpose breeds.

IN-EGG SEX DETERMINATION

Scientists have been looking at alternative measures to the culling of chicks, such as the ability to determine the sex of the embryo before hatching. By doing so, male eggs can then be sent to cosmetic, animal feed or pharmaceutical companies, while female eggs can be further incubated.

Researchers have found that sex could be determined with 84% accuracy by passing light through the egg, as male chick embryos show higher opacity than female embryos[1]. Another prototype, developed in Germany, allows sex determination by shining a laser through the eggshell and by measuring fluorescent signals from blood cells using infrared Raman and fluorescence spectroscopy[3].

Other methods have already been commercialised, such as the SELEGGT process, also developed in Germany, which involves the extraction of fluid from the fertilised egg which is then analysed to determine whether or not it contains female hormones (estrone sulphate)[2].

However, there is concern that such procedures are being carried out at a stage where the development of the chick embryo is receptive to pain. It is therefore important that the procedure (and preferably the destruction of the eggs) can be carried out prior to the development of pain sensitivity in the embryo.

Gene Editing has also been proposed as a potential solution where, using CRISPR, the sex chromosomes of hens are modified so that their male offspring carry a fluorescent biomarker allowing hatcheries to easily differentiate between sexes.

However, such an approach does not address some important broader welfare-related issues. For example, breeding birds will still be required to produce the 'male chick' eggs that will be disposed of; and the eggs will still be incubated (up to a point), so the waste issue will not be resolved if the developed eggs cannot be utilised in some way.

REARING CHICKS FOR MEAT

Hatching and rearing the male chicks for meat consumption is practised in some European countries.

However, unlike broilers (meat chickens), which are specifically bred for larger breast muscles and legs, male chicks from the egg industry grow more slowly and have a less desirable body composition, which may not provide an economically viable proposition for meat production in the UK. There may also be other currently unknown welfare issues associated with rearing the males.

DUAL PURPOSE BREEDS

The development of dual purpose breeds may offer the most preferable alternative, i.e. developing breeds that are suitable for both egg and meat production: where the males are utilised in the meat industry and the females for egg production. However, it is unlikely these breeds will be as productively efficient as the conventional meat and egg producing breeds, so more animals may be required to maintain an equivalent level of production.

It is highly likely that the welfare of male laying hen breeds, and any dual-purpose breeds developed, will be significantly better than that of conventional meat chicken breeds. As these breeds will, to some extent, replace the rearing of conventional meat chicken breeds, there will be a net welfare benefit to pursuing these initiatives.

CONCLUSION

Although there seem to be a variety of potential methods, there is still a need for further development to improve their accuracy and to ensure cost effectiveness. In addition, other aspects need to be taken into account, such as the ethics related to the use of gene editing of farm animals, or the ethical and welfare issues concerning the keeping of the parent birds that are laying eggs that have no value.

Also, in the UK at least, there are concerns about the welfare and ethical issues surrounding alternative feed sources for the animals that currently eat the culled chicks. Replacement food may come from young rodents or rabbits, which in contrast to the day old chicks, are specially bred for this purpose, kept in unknown conditions and killed using unregulated methods, raising further welfare issues and ethical questions. Alternatively, should the culling of male chicks be prohibited in the UK, there could be a resultant increase in the number of chicks imported from other countries where the parent stock welfare and hatchery standards could be poor.

The work of the RSPCA

The RSPCA works hard to improve and safeguard chick welfare by encouraging producers to adopt the *RSPCA welfare standards for hatcheries*. These higher welfare standards, which are stronger and more detailed than the basic legal requirements in many key areas, have been developed by the RSPCA Farm Animals Department to ensure that higher standards of animal welfare are met at all stages of the animals' lives, including the hatching, handling and humane killing of chicks. The *RSPCA welfare standards for hatcheries* permit chicks to be culled by either maceration or by exposure to certain gas mixtures and include a number of strict requirements to safeguard welfare at the time of killing. Whilst we recognise there are ethical concerns with the killing of day-old male chicks, the welfare of these animals is our primary concern and our standards aim to ensure that the process is carried out as humanely as possible.

The RSPCA welfare standards are regularly reviewed in the light of scientific evidence and practical experience and through consultation with key stakeholders. We will continue to monitor the research regarding humane and ethical alternatives to the killing of day-old male chicks.

References

1. Alin et al. (2019) Non-invasive broiler chick embryo sexing based on opacity value of incubated eggs. Computers and Electronics in Agriculture. Volume 158, pp 30-35.
2. Respeggt Group https://www.respeggt.com/solutions/
3. Galli R, Preusse G, Schnabel C, Bartels T, Cramer K, Krautwald-Junghanns M et al. (2018) Sexing of chicken eggs by fluorescence and Raman spectroscopy through the shell membrane. PloS ONE 13(2): e0192554.