



Mortality in Poultry is one of a range *Animal Welfare Approved* technical papers designed to provide practical advice and support to farmers. For more information visit www.animalwelfareapproved.org

SHORT DESCRIPTION OF TECHNICAL PAPER CONTENT

About this technical paper

This technical paper provides farmers who are participating in the *Animal Welfare Approved* program with advice on minimizing mortality in poultry. The paper looks at ways to prevent mortality problems during the brooding phase, as well as out on the range.

KEYWORDS

Welfare; poultry; mortality; smothering; disease; brooding; predators; management



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Mortality in Poultry

Animal Welfare Approved has the most rigorous standards for farm animal welfare currently in use by any United States organization. Its standards have been developed in collaboration with scientists, veterinarians, researchers, and farmers across the globe to maximize practicable, high-welfare farm management.

Mortality

Managing a flock of chickens is different from managing any other species in that there are larger concentrations and they are smaller. These challenges require a greater degree of attention to detail and a higher level of observation. From a welfare – and economic – point of view it is important to minimize mortality. This paper looks at the common causes of poultry mortality and ways to reduce it.

What are the common causes of mortality?

Temperature and ventilation in the brood house are generally considered to be significant factors for mortality early in the chicks' life. However, the quality of chicks introduced to the system is also an important consideration.



If chicks arrive with a yolk sac infection, for example, then early mortality is likely to be high. But after one week of age mortality is more likely to be the result of predation, disease or smothering.

What level of mortality should I expect?

It is worth looking at mortality in the flock as two separate 'time periods':

- Mortality in the first week after placement
- Mortality from the second week onwards.

Mortality during the first week is often related to the quality of day old chicks, which is often outside the control of the farm. While a mortality rate of up to/around 1.5% during this first week is not unusual, it is obviously worthwhile taking steps to minimize your losses.

Throughout the life of the flock you should aim to keep mortality as low as possible. After the first week, if the mortality rate rises above 1% in any single day you must

assess the cause and address it. You should also consider contacting your vet or poultry advisor for further advice.

What can I do to reduce mortality on my farm?

As mentioned in the introduction, mortality is both a welfare and an economic issue. The welfare aspect is clear – being sick or injured to the point that death ensues is not welfare positive. On the economic side, you have to remember that the cost of bringing eggs or meat birds to market is not just the cost of maintaining each individual bird but the overall cost of all the birds or chicks you bought, looked after and fed that died before they could contribute to the farm income.

The following section looks at some of the practical steps you can take to reduce mortality on your farm.

Chick management

Generally, you should aim for zero mortality. However mortality of 1.5% or less in the first week of the chick's lives is likely to arise from causes beyond your control. If you experience mortality rates that exceed this you must take action.

Always check the chicks when they arrive from the hatchery or when you remove them from your hatcher. Chicks must be active, clean and dry with open, bright, and alert eyes. If chicks are looking dull or inactive a proactive diet including electrolytes must be considered.

Make sure the temperature and the humidity in the brooding house is kept at the right level. When chicks first arrive the brooding area should be pre-heated to around 90F, with this temperature reduced by 5–10F per week as the birds grow and develop. If it is too cold the chicks may huddle and smother; if it is too humid or too dry (aim for 65–70% humidity) then respiratory problems can occur.

A working thermometer at bird level will help you to check the temperature in the brooding area, but looking at the way the birds behave will also give a good idea of whether the temperature is right – see figure 1 below. If birds are all at the edge of the brooding area – as far away from the heat source as they can get – then it is too hot. However, if they congregate right under the heat source it is too cold.

Ideally birds should be spread evenly over the whole brooding area. If they always favor one side of the brooding area over another it could be a sign that draughts are coming in on the side they avoid using; alternatively, outside noise might be disturbing them and causing them to move over.

Where chick mortality does occur it is crucial that you determine what is causing the deaths. Any death is an indication that a review of the flock and the facilities is needed. For example, a yolk sac infection acquired from the hatchery will cause death in the first few days of life, with a peak at day three or four. In such cases mortality can reach 10% or more. Similarly, it is reasonable to expect a small number of chicks which are too small or weak at placement to die at up to seven days old

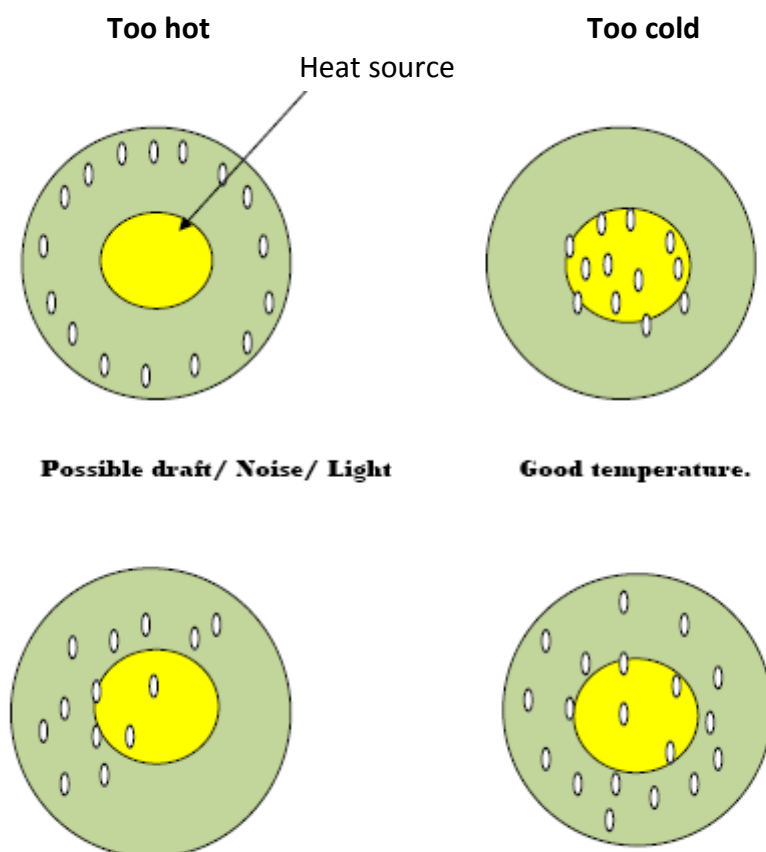
(starve-outs). Alternatively, the deaths could be the result of insufficient or poorly placed supplies of feed and water.

Reduce the risk of smothering

Smothering happens when something triggers the birds to form a tight huddle. The birds at the bottom of the heap can suffocate or suffer fatal injury. Smothering can occur at any age in the bird's life; however, some causes are more easily avoided than others.

It is important to ensure that the temperature and humidity in the brooding house are kept at the right levels (see above and figure 1 below). If chicks are too cold they may huddle and smother. If you know that temperature variations occur across the house – or if you anticipate any significant changes in temperature – it may be worthwhile brooding the chicks in a circular enclosure under a heat source so that they do not move to colder corners of the house, pile up and smother.

Figure 1 Chick positioning under the brooder



When you move birds from a brooder to a field house it can help to walk through them a few times on the first evening so they spread out throughout the house and do not get in the habit of grouping together. Using corner boards to round off corners in the house can help prevent birds from piling up and smothering. Birds will

still sometimes smother in the middle of the house for no apparent reason – this type smothering has been associated with noise drafts and sudden lighting changes.

Try to avoid sudden loud noises around the birds. It may help also to acclimatize chicks to regular farm sounds before moving them out to the field houses. For example, some farms play tape recordings of tractor noises, bird song, or other common sounds on the farm to acclimatize the birds. Be aware of any local sources of loud noises that could startle the birds, such as low flying aircraft. Some farmers have found that approaching the local airbases to discuss the problem (and providing the grid reference of poultry fields) has encouraged pilots to avoid the area – even if only for a temporary period.

Finally, controlling or deterring predators can help to avoid the risk of panic-induced smother out on the range (see ‘Control predators’ below).

Control disease

Some diseases have the potential to cause 100% mortality. Other diseases do not cause the death of any birds but may affect feed conversion to the point that a flock doesn’t reach its desired weight affecting carcass quality and egg production. As part of your planning make sure to find out what diseases may present a risk to the birds on your farm and learn the key symptoms. Get advice from your vet or poultry advisor, or refer to the further information listed at the end of this technical paper.

Key factors that can increase the risk of disease include the number of birds on the farm, whether or not you keep other species of bird, your rotational management of the land, feed type and source, stress levels, breed type and so on.

It is important to ensure that you manage the birds to minimize the risk of disease. For example, good management can prevent coccidiosis from becoming a major problem – even where coccidiosis oocysts are present on farm – as a natural level of challenge can lead to the development of good immunity in the flock. In fact, this is the case for most of the common diseases seen in the poultry sector. Understanding how a disease develops and is transmitted can help minimize the risks of major problems. Nevertheless, a vaccination program may be necessary where disease(s) cannot be controlled by management alone. See the ‘Further information’ section at the end of this paper for more resources to control and prevent disease.

Control predators

Just about every predator out there will take poultry if they get the chance. Coyotes, dogs, foxes, bobcats, weasels, vultures, hawks and owls will all kill birds. Rats will take chicks. You need to determine what the main predator threats are on your farm and take the necessary preventative action before any problems occur. Animal Welfare Approved allows euthanasia of predators only when all non lethal methods have been exhausted.

Where predators are a risk you must shut your birds in at night and ensure that the house is predator proof. Remember that a house that keeps birds in does not

necessarily keep predators out. Predators may try to dig in to a house from underneath or gain access through the roof. Even small gaps in the house itself or woven wire surrounds can be a risk: it is amazing just how small a space predators like raccoons can squeeze through to get to your birds.

You can exclude mammalian predators from the range area by using electrified fencing. A seven or nine strand electric fence with alternately live and earthed wires can be an effective deterrent (see the case study below). Note that the bottom wire should be live and to prevent shorting out you will need to control the grass below the fence using a weed whacker, weed control sheeting or herbicide.

You can often deter aerial predators by using decoys but it is important to move or change decoys regularly so that predator birds do not become accustomed to them. Aside from decoys playing bird sounds has also been shown to be effective

Be aware of areas of cover that may harbor predators around the range area. Balancing the need to provide cover or shelter to encourage birds to range without giving predators somewhere to hide can be difficult, although this becomes less of an issue where predators are excluded from the main range area by fencing.

Where a particular coyote or other predator has become a challenge that cannot be overcome with exclusion, live trapping and removal, the only solution may be to use lethal force. This should only be attempted by an experienced person. *Animal Welfare Approved* standards require that exclusion of predators is the primary control method. When this is not possible lethal control in a manner that does not cause pain and suffering is permitted when predators are causing an immediate threat to birds. If there is an ongoing predator problem that cannot be solved by exclusion alone you will need to discuss a suitable control plan with *Animal Welfare Approved*.

The use of poison and snare and leg hold traps against predators is prohibited.

Guardian animals

A number of different species have been used as guardian animals to protect poultry. Llamas, alpacas, donkeys and livestock guardian dogs can all be considered.

Guardian dogs such as the Pyrenean mountain dog are most often found guarding sheep but they can be used for poultry, too. Livestock guardian dogs (LGD) have to be trained to bond with the flock they are supposed to be protecting. And the birds have to learn that the dogs are not a threat. This can be tricky as young dogs can be quite boisterous and may damage birds without meaning to. If you've never had LGDs before get advice from someone who has before introducing one to your flock.

Llamas and alpacas can also be used. Male gelding llamas will guard sheep, goats or poultry as part of their natural instinct to 'guard their group' and will chase off any predator that intrudes on 'their' group. Iowa State University has carried out research showing that llamas can be extremely effective at protecting poultry with poultry farmers rating llamas as either 'effective' or 'very effective' in 92% of cases

(see American Livestock Breeds Conservancy paper referenced in 'Further information' below). However, it is worth noting that not all llamas are suited to this role so again try to get some expert advice in selecting appropriate animals.

Summary

By monitoring your birds closely and keeping records you can determine at what age your peaks in mortality occur – and the causes – and target your response accordingly.

If high mortality occurs during the brooding phase check the chicks are healthy when they arrive from the hatchery – and contact the suppliers if you suspect disease. If good quality chicks are delivered then check your management of temperature and that feed and water supplies are adequate and easily accessible. If mortality occurs after brooding then check the disease profile on your farm and be aware of any predator problems. If birds are going missing for no reason you should suspect predators.

Case study – using a predator exclusion fence

Abbey Home Farm decided to expand their poultry enterprise to include meat chickens. The farm manager, John Newman, knew from his experience with laying hens that both foxes and hawks were potential predators on the farm.

The foxes were kept away from the layers by using a double electric fence. But as it was necessary to rotate the fields for each batch of meat birds a more permanent solution was needed.

The meat birds are kept in a 40 acre field which is also used for the outdoor pig enterprise. So it was worth protecting both piglets and chickens by surrounding the entire field with a nine strand electric fence. This has alternate live and earth wires with the bottom wire – only a few inches from the ground – being live.

As this is an organic farm it was not possible to keep the bottom strand of the fence free from vegetation using herbicides. Weed whacking and mowing was unrealistic, so a strip of myplex – a product more often used as a plastic mulch by vegetable growers – was placed all round the field under the fence line.



The entire project was carried out by a contractor and the overall cost – including materials and labor – was \$7,500 for 1,600m of fence. The project has significantly reduced mortality in the meat birds from four legged predators, although hawks can still be a problem on farm.

Animal Welfare Approved will allow the use of herbicides when weeds cannot be practically controlled by other means, so if you aren't registered as an organic farmer

you could use this kind of predator fence without the plastic sheeting and spray the fence line instead. This would obviously reduce the cost.

Further information

The Chicken Health Handbook by Gail Damerow (Storey Books 2008) covers a range of health and disease issues. It is aimed at small scale poultry producers and has plenty of information to help you identify health problems in your birds.

The Poultry Site is an internet resource aimed primarily at larger scale poultry producers. However, their information on diseases is comprehensive and relevant to all: <http://www.thepoultrysite.com/diseaseinfo/>

The Organic Veterinary Compendium is a UK-based website aimed primarily at organic producers. However, it contains a lot of useful information on prevention of specific poultry diseases: <http://www.organicvet.co.uk/>

Protecting Heritage Turkeys from Predators – this American Livestock Breeds Conservancy article includes information on guardian animals:
<http://www.albc-usa.org/documents/turkeymanual/ALBCturkey-8.pdf>

Predator Friendly works with ranchers and farmers so that livestock can be protected while co-existing with predators. Their practical co-existence section includes information on guardian animals:
<http://www.predatorfriendly.org/how-to/guardian.html>

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