



Hatchery Management

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Embryonic development in poultry takes place outside the body of the hen. For the development of a healthy flock of productive birds, it is essential that more attention should be given right from the incubation stage of the eggs. Therefore, appropriate hatchery environment, proper collection and preservation of fertile eggs, adequate temperature and relative humidity should be provided.

Development of the Embryo

Wide variation occurs among different species of poultry in the time required for their eggs to develop and for hatching. The embryonic development is very rapid compared to mammals. According to Dr. Margaret Vince of Cambridge University, communication takes place between the matured chicks inside the eggs about the time of hatching.

The development of zygote starts immediately after fertilization inside the mother due to the cell division process of the ovum. Shortly before or after laying, the blastodermal layer undergo a process called

gastrulation to form different layers. This process continues until the formation of three well-differentiated layers viz. outer ectodermal layer, inner endodermal layer and middle mesoderm, which originate only after the incubation. They form the base cells from which the different organs originate. The ectoderm gives rise to skin, feathers, beak, claws, nervous system, lens and retina of the eye, linings of mouth and the vent. Bones, muscles, blood, reproductive and excretory organs originate from the mesoderm and from endoderm, the lining of digestive, respiratory and secretory organs are developed.

Operations in the Hatchery

Hatchery operations consist of various routine procedures, so that the egg is taken care right from the time of laying to the time of hatching. The hatchery life of eggs starts with selection and storage of fertile eggs till incubation. The fertile eggs are usually kept in the setter for first few days and transferred to the hatcher 2 to 3 days before hatching date.

Selection and storage of eggs

The selection of eggs for hatching should be done with great care and accuracy. Cracked, dirty, misshapen, very large or very small eggs should be rejected. Thin shelled and highly porous egg tends to lose the moisture during incubation, which may lead to poor hatchability.

Prolonged and unscientific storage of eggs leads to poor hatchability. The egg holding rooms form part of the hatcheries for the pre incubation storage. The eggs should be brought back to normal room temperature before it is set into the incubator. However, the chicken or turkey eggs should not be stored more than a week. Usually the eggs are stored for more than two weeks; egg should be turned daily in order to avoid adhesion of the membranes to the shell.

The storing temperature for the egg is 59 to 60°C, if it has to be stored for less than a week and 55 to 60°C if it has to be stored more. A pre-warming period of 18 hrs should be allowed for stored eggs before setting. The relative humidity should be 75-80% and candling of eggs should be done to identify the infer-

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tile and faulty eggs before keeping them in the setter.

Setting and hatching

The incubation process in the hatchery is carried out in two types of incubators called setter and hatcher. The eggs are kept in setter up to 2-3 days prior to hatching and in the last 2-3 days, they are transferred to the hatcher. The setters have the turning capacity, which turns the eggs once in every hour at 45° to both sides.

After candling of eggs, they are kept in setters with broad end up for 18 days in the case of chicken eggs. Before 2-3 days of expected time of hatching they are taken out and candling is repeated to detect the infertile and dead eggs. The fertile one was then transferred to the hatcher where the chicks hatch out. Various types of setters and hatchers are available with different egg carrying capacity. The eggs should be turned for the time kept in setter. The eggs are kept in horizontal position in the hatcher and no turning is required further.

Temperature and humidity

The successful hatching results invariably dependent on the factor of temperature control inside the incubator. The optimum temperature level is 98.6°F to 100.4°F in the case of forced draft incubator and 1° higher in still air incubators. The minimum temperature at which the embryonic development occurs is the physiological zero, which is normally 70°F. Sub-optimal temperature slows up some stages of embryonic development and leads to deformed and faulty chicks. Increased temperature results in chick mortality and an increased percentage of crippled and deformed ones.

Role of gases in incubation of eggs

The oxygen is taken inside from the atmosphere for metabolism of chicks and carbon dioxide gas is expelled. Atmospheric air containing 21% oxygen is required for embryo development and a slight decrease or increase in the oxygen level gives a faulty hatch. Similarly there should be an optimum carbon dioxide (0.5% to 2.0%) level inside.

Candling and hatching

Candling of eggs are done before the eggs are transferred to the hatcher. Infertile and dead ones are rest can be discarded.

Post hatching operations

It includes the administration of vaccines, sexing of chicks, dubbing, debeaking, delivery of chicks and disposal of waste materials. The vaccine against Marek's disease is given on the day of hatch itself. In some hatcheries, the first dose of RD vaccine (Lassotta strain) administered on the 1st day, one drop in each nostril.

Two approved methods of sexing are carried out normally. The protruberance in the cloaca is tested and those chicks with cloacal structure are marked as male. The marking is done in the head using ink and the males and females are kept separately. An instrument called proctoscope can also be used to detect the testes in males. Both this methods need high skill and experience. The dubbing is the removal of upper comb in certain breeds specially white leghorns using dubbing scissors. The debeaking is done using debeaker. The anterior 2/3rd of the beak is cut and removed and this process is carried out in order to avoid cannibalism and wastage of feed.

Sanitation in hatchery operation

The important contaminant spreading through unhygienic hatchery operations are the mycoplasmal organisms. Fumigation of the hatchery and equipments using potassium permanganate crystal and formaline may prevent the contamination. Washing and drying of eggs, providing separate rooms for hatchery operations and proper disposal of hatchery waste are some of the precautionary methods to avoid the hatchery contamination. Fumigation can be carried out during the 1st 12 hrs of incubation and from 18th to 20th day of incubation. This procedure should be avoided between 12th hr and 84th hr, Since it may damage the embryo developing. Part of the hatchery waste can be used to make the hatchery waste meal for birds and pigs. Personal hygiene of workers can also be considered as an important sanitary measure to control the source of contamination.

