



Fig 3: Candling of eggs at 7th day of incubation

2. Eggs candle clear, broken eggs show small embryo and blood ring present	Similar reasons as 1, besides nutritional deficiencies like VitB2/ B5, VitA &E, Cu, Boron
3. Dead embryos, early incubational period, yolk sac circulatory present, embryo on left side	Same causes. Proper ventilation and turning of eggs should be ensured in hatcher.
4. Dead embryos, mid incubation, fully developed embryo	Proper incubational temperature, humidity, turning and ventilation should be maintained.
5. Dead embryos: >18 days of incubation	Proper incubational temperature, humidity, turning as well as hatcher temp. n humidity Contamination from moulds can be prevented by proper ventilation, nutritional deficiency of breeder flock s condition should be taken care of .Proper transfer of eggs to hatchery and hatchery management plays a crucial role.

Supply- Fertile eggs of backyard/ornamental /indigenous poultry varieties including ducks are available for sale in hatchery section of poultry unit .Incubation and hatching facility is also available for interested farmers for setting eggs in institute hatchery section at nominal prices.

I. Removal of hatch:

Chicks should be observed several hours before hatch/ pull time. They should be pulled out by hand when they are about 5%wet around the neck. After removing chicks from hatchery, the temp of holding room should be maintained at 75°F, 75% to reduce chilling and dehydration. Hatcher compartments along with debris should be fumigated and cleaned properly after pulling out hatch.

Incubation and hatching of duck eggs:

The principle of incubation and hatching is same as chicken eggs although incubation period is 28d .The soiled eggs should be cleaned by suitable egg disinfectant and then fumigated as per requirement.

Duck eggs require more humidity i.e. 86% during first 25 days of incubation and 94% for remaining 3 days. Sprinkle warm water on eggs in setter from 2nd day onwards till 25th day. Turning of eggs is done at 180° angle unlike chicken eggs.

Biosecurity in hatchery:

The hatchery should be situated at least 500ft from poultry house. The hatchery buildings should be arranged to give better use of different areas with physical separation of space for personnel facilities; receipt, storage of eggs; incubation; hatching; and handling of day-old birds; equipment washing; waste disposal office space. The eggs and chick should move from one room to another in such a way that there should not be any back tracking.

Commonly encountered problems	Preventive measures
1. Eggs candle clear, broken eggs show enlarged germinal disc, fertile but no blood	Eggs should be stored <7d, proper temp. in storage room, Breeder flock should be free of egg-borne infections (Salmonella), collect eggs frequently and maintain proper incubation temp, do not over fumigate specially during 12-96hrs of incubation

Incubation and Hatching: Problems and Prevention



Authors:

Dr. Nibedita Nayak, Scientist (Poultry science)
Dr. Amiya Ranjan Sahu, Scientist (Animal genetics and Breeding)
Dr. Ashitha K, SRF (Poultry Seed Project)

Published By:

Dr. E.B. Chakurkar
 Director

ICAR-Central Coastal Agricultural Research Institute
 Old Goa-403402, Goa

For details please contact
 Director

ICAR-Central Coastal Agricultural Research Institute
 Old Goa-403402, Goa

Phone-08322284677/78/79

Fax-08322285649

Email-director.ccari@icar.gov.in

Website-www.icargoa.res.in



भाकृअनुप-केन्द्रीय तटीय कृषि अनुसंधान संस्थान

(भारतीय कृषि अनुसंधान परिषद)

ओल्ड गोवा- ४०३ ४०२, गोवा, भारत



ICAR-CENTRAL COASTAL AGRICULTURAL RESEARCH INSTITUTE

(Indian Council of Agricultural Research)

Old Goa - 403 402, India

Introduction

Egg is a biological structure meant for reproduction. It protects and provides complete nutrition for the developing embryo and serves as principal source of food for early chick. It is the most nutritious unadulterated food against which quality of other protein is measured. Fertile egg is obtained after successful meeting of male and female birds. Then the egg is set for incubation which means efficient transition of fertile egg into a live & healthy chick. The process of hatching eggs production should be followed strictly with proper bio-security measures to get optimum hatchability and quality chicks.

Nutritional composition of egg

Egg contents	Chicken	Duck	Quail
Weight (gm)	50	70	10
Calorie (Kilo Calorie/100gm)	158	185	158
Water	74.5	70.8	74.3
Protein	12.14	12.81	13.05
Fat	11.15	13.77	11.09
Carbohydrate	1.20	1.45	0.41
Ash/ Minerals	0.94	1.14	1.10

Types of incubation: A. Natural Incubation: Natural brooding of eggs by broody hen using natural heating source. A broody hen incubate 10-15 eggs in one cycle.

B. Artificial Incubation: This process utilises artificial ways for maintaining temperature and humidity in setter and hatcher for normal growth of chick embryo.

Hatching egg production:

A. Collection of eggs:

Hatching eggs should be collected from the nest or cage four times a day which may increase i.e five/six times depending upon extreme weather conditions. Eggs should be collected frequently to avoid any contamination with the nesting material. Nesting material should be good absorbent, durable, coarse, porous and cheap. Generally wood shavings, saw dust, rice husk, straw, dried sugarcane and shredded paper are used as nesting material. Hens should be trained to lay eggs in the nest only.

B. Transportation of eggs:

Eggs should be collected on flats as they allow the maximum amount of air circulation around the eggs. Plastic flats are always better than fibre flats. Egg boxes with holes may be used for transporting hatching eggs to long distances. Avoid jarring and shaking of eggs while transporting.

C. Egg sanitation/Fumigation:

Spray applications: Warm solutions containing disinfectants can

be sprayed onto clean eggs. It should not react with the cuticle or deposit in egg surface. Sand paper also used to rub off dirty eggs. Quaternary ammonium has been found to be excellent egg sanitizer for hatching eggs.

The best sanitation method after receiving eggs in hatchery is fumigation. Hatching eggs can be fumigated at 2X conc for 20 mins while in setter except between 24 hrs to 96hrs. (1x conc. contains 40ml formalin with 20g of KMnO₄ for 1000ft³ of space)

D. Selection, Grading & Traying of hatching eggs:

The size of eggs should fall into the standard breed size, very small and very big eggs are rejected. Mis-shaped eggs with abnormal shell e.g. thin, porous, ridged and dirty should be rejected. Minimum egg weight for quality chick production is above 50gm. The egg trays are made as per the size of eggs like bigger trays for duck eggs, standard size for chicken eggs and small size for quail eggs.

E. Egg storage in cold room:

Selected eggs are stored at 65°F/18.3°C with relative humidity-75-80%, at which there is no embryonic development depending upon setting/hatching schedule of farms. Eggs should not be stored more than 4 days to avoid drop in hatchability. Temp. should be decreased to 13°C if egg to be stored for 7-10 days. Eggs from the younger breeder flock can be stored longer than old breeder flock.



Fig1: Storage of eggs in cold room after fumigation, selection and grading

F. Warm eggs prior to setting:

Hatching eggs should removed from egg storage room and be kept around 72°F/22°C for 5-6 hrs before placing them in incubator. Condensation of moisture occurs on egg surface as they are taken out of storage room which may increase the chances of contamination. It is advisable to warm eggs before placing them in incubator which increases hatchability by 1-2%.

G. Setting of eggs and Transfer to hatcher:

Setting time should be adjusted as per the time of chick supply. If chicks are to be supplied in early morning then set in between 5-6 P.M. The conditions for optimum hatchability in setter should

maintained as follows:

Parameters	1-18 days of incubation	19-21 days of incubation
Temp. (°F)	99.5-99.75	97-99
Humidity,%	50-60	75-80
Air supply	Adequate provision in the incubator	Adequate provision in the incubator
Position of eggs	large end up	horizontal
Turning of eggs	6-8times/day @90°	No turning



Fig 2: Eggs in proper positions in Setter/incubator and hatcher in hatchery of ICAR-CCARI

Table 2: Incubation period for incubating eggs of various species of poultry

Species	Incubation period(Days)	Days of transfer from setter to hatcher
Chicken	21	18-19
Duck	28	24-25
Turkey	28	24-25
Muscovy duck & Swan	35	30-31
Goose	28-34	25-26
Guinea fowl	26-28	24-25
Japanese quail & Pigeon	17	14-15
Pea fowl	28-30	25-26
Ostrich	42	35-36
Emu	54	47-48

H. Candling of Eggs:

Candling should be done at 7-8th day and 18th day to find out the infertile eggs and discard them in order to save space and energy. Eggs are tested in front of sharp, bright light and assessed for any cracks in shell, position of air cell, yolk & albumen and presence of blood vessels etc. The porous eggs shell allows light to pass through indicating transparent or opaque type. Transparent is infertile while opaque indicates fertile eggs. Individual Candler or mass Candler should be used for this purpose.