

EGG RESIDUE BREAKOUT ANALYSIS FOR BACKYARD BIRDS

Sue Ann Hubbard, MS, DVM, Dip. ACPV

Abstract

Solving hatching problems in a backyard chicken flock presents a number of unique challenges owing to the many variables that can affect the chick successfully removing itself from the egg. The first step to solving hatch problems is to diagnose the problem by performing an egg residue breakout analysis. Information may be gained to determine if the egg was fertile, approximately when and why the embryo died, and diagnose why the hatch may not have been successful. The purpose of this clinical technique article is to be a practical guide for performing routine egg residue breakout analysis on backyard chicken flocks. Copyright 2015 Elsevier Inc. All rights reserved.

Key words: breakout; chicken; embryo; hatchability; poultry

There is nothing more frustrating than anticipating a successful hatch only to find out in 21 days that the eggs remain intact. Diagnosing why the eggs did not hatch is not very difficult. With a few minor preparations and a little bit of practice, one can ascertain if the egg was fertile, approximately when the embryo died, and diagnose why the hatch may have failed.¹ Once eggs have been incubated for 21 days and all viable chicks have hatched, eggs that did not hatch should be reserved for an egg residue breakout analysis.

MATERIALS AND METHODS

Performing egg residue breakout analyses is relatively easy to learn and requires very little equipment. Breakouts (i.e., removing the dead embryo from the shell) should be performed immediately following hatch in an area that allows for excellent visibility. A bucket to break the eggs into and collect the residual egg contents is a necessity. A bucket, gloves, apron, and eye protection are also required to adequately perform an egg residue breakout analysis (Fig. 1). The information collected during an egg residue breakout analysis should be recorded to compare with past or future analysis to monitor hatching patterns within a particular flock (Table).

For the hobby/backyard poultry flock, determining the approximate age of embryo death is often sufficient to monitor hatching problems.

The different categories used for recording embryo death in a breakout analysis are as follows: infertiles, early dead, middle dead, and late dead. Other areas that should be noted are pipped eggs, the amount of contamination, eggshell cracks, embryo anomalies, eggs set upside down, and cull eggs. All eggs "broken out" should be accounted for in the categories of infertile, early, middle, or late. All other information should be noted after the egg was first recorded in one of these categories.

To begin the egg residue breakout analysis, remove the shell of the egg at its largest end. Be sure to look at the shell remnant that was removed to expose the internal contents of the egg before discarding it. A very small embryo may adhere to the inner air cell membrane (Fig. 2) and may inadvertently be discarded and recorded as an infertile egg. Infertile eggs are those that show no

From the Merck Animal Health, Poultry Unit, DeSoto, KS, USA

Address correspondence to: Sue Ann Hubbard, MS, DVM, Dip. ACPV, 101 Highway 541 South, Mt. Olive, MS 39119.

E-mail: sue.hubbard@merck.com.

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FIGURE 1. Egg breakout analysis equipment.

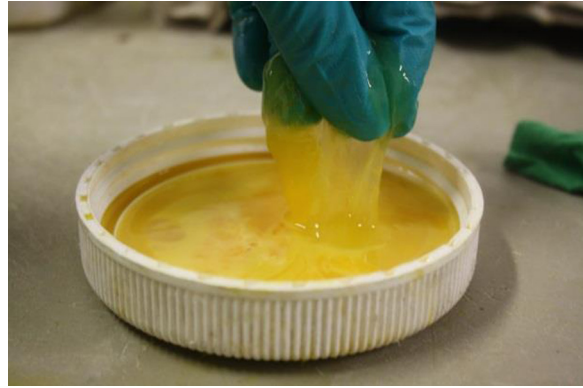


FIGURE 4. Fertile egg albumen with a “jellyfish” appearance.



FIGURE 2. Remnant of blood ring and partial embryo adhered to large end of eggshell.



FIGURE 3. Infertile egg.

signs of development. To determine if an egg is fertile, you must first locate the germinal disc or the blastoderm. By the time an egg is laid, the embryo consists of more than 20,000 cells within the germinal disc. A fertile germinal disc often has a “donutlike” appearance. If the egg is infertile (Fig. 3), then the germinal disc is a solid white circle on the yolk. Do not confuse the chalazae with the germinal disc. The chalazae are ropelike structures, in both fertile and infertile eggs, that hold or suspend the yolk within the center of the egg. If the egg is fertile, even with early embryonic death, the albumen will be thickened (Fig. 4). Conversely, an infertile egg's albumen is typically watery after 21 days of incubation.

The early dead category represents embryonic mortality up to 7 days of incubation (Fig. 5). The embryo's eye will develop on day 6, and the egg tooth will appear on the embryo's beak at approximately 7 days of incubation. It is sometimes useful to divide early dead into truly early dead (day 1 to 3) and later early dead (day 4 to 7). This will be helpful in determining the cause of early dead mortality, if one category is significantly higher than the other.

The middle dead category represents embryonic mortality from day 8 until day 15 of incubation (Fig. 6). During this time period, the embryo will begin to develop feather tracts (day 12) and begin to resemble a bird. On approximately day 15, the embryo will bring

TABLE. Example of a simple egg residue breakout analysis form

No. of eggs	Nonfertile	Early	Middle	Late		
Percent Pipped	Contaminated	Mold	Cracked	Anomalies	Cull eggs	Upside down

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