

PHEASANT EGG STORAGE EXPERIMENT OVERVIEW



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OVERVIEW

■ **Completed Experiments**

■ **Pheasant Egg Storage**

- **Background**
- **Hypothesis**
- **Materials and Methods**
- **Results**
- **Conclusion**

BACKGROUND

EGG STORAGE EXPERIMENTS

■ Egg Storage

■ Why?

- Logistics: inventory, fill machines/orders, scheduling, etc.
- Physiology: “Pause” development (diapause, physiological zero)

■ Aspects

- Collection, egg orientation, temperature, fluctuations, time
 - All have an affect on hatch and growout (Yoho et al., 2007; Whipple, 2010)
- Breeder age x humidity (Walsh., 1993)
- Time x temperature effects (Kirk et al., 1980; Wilson et al., 1984)
- Other factors likely have influence
 - Jostling, “settling”, turning
- Temperature: Chicken eggs stored at ~69 °F

BACKGROUND

EGG STORAGE EXPERIMENTS

■ Pheasant

- Ringnecked (Common) Pheasant, *Phasianus colchicus*
- 24-25 day incubation
- Meat, hunting



HYPOTHESIS

EGG STORAGE EXPERIMENTS

Eggs stored at different temperatures will have different hatch characteristics

Chicks from eggs stored at different temperatures will have different growth characteristics

MATERIALS & METHODS

EGG STORAGE EXPERIMENTS

- **Commercially sourced eggs**
 - MacFarlane Pheasants, Inc.
- **Uniform Eggs**
 - Same day of lay/collection
 - Same flock
 - Quality
- **Randomly assigned treatment**
 - Storage temperature
 - 50, 55, 60, 65, 70 Fahrenheit



MATERIALS & METHODS

EGG STORAGE EXPERIMENTS

- **Storage**
 - Seven day storage
 - GQF Sportsmen Series incubators
 - One for each treatment (5 total)
 - In same walk-in cooler (45 °F)
- **Temperature held within two degrees**
 - Same atmosphere
 - Air circulation



MATERIALS & METHODS

EGG STORAGE EXPERIMENTS



- **Treatments incubated in same machine in randomized arrangement**
 - Six hour pre-warm at 80 ° F
- **Industry standard incubation protocol**
- **Same hatcher, separated by baskets**
- **Hatch pulled at same time for all treatments**
- **Hatch Data**
 - Pull: hatch, cull, spray leg
 - Breakout: time of embryo mortality, anomaly, malposition, contamination

MATERIALS & METHODS

EGG STORAGE EXPERIMENTS

Growout

- Placed in pens by treatment
- Pheasant
 - Trial I: 65 birds/pen, 50, 55 – 4 pens each; 60, 65, 70 – 3 pens each
 - Trial II: 60 birds/pen, 70 2 pens; 50, 60, 65 – 3 pens each; 55 – 4 pens
- Feed & water provided *ad libitum*
- Birds weighed as pen at placement, day 7
- Feed consumption as pen
- Mortality and dead weight were recorded daily
- Other specifications aligned to industry standards



MATERIALS & METHODS

EGG STORAGE EXPERIMENTS

- **Data collected in Microsoft Excel and analyzed using SAS 9.4**
 - $P \leq 0.05$ considered significant
- **Growout analysis**
 - MIXED procedure and means comparison - Tukey's Post Hoc Test
- **Hatch analysis**
 - Chi-Square



RESULTS

EGG STORAGE - PHEASANT

Table 1. Effects of egg storage temperature on hatch characteristics of pheasants¹

	Temperature (degrees Fahrenheit)					
Measure (%)	50	55	60	65	70	P-Value
Hatch of Fertile ²	79.44	80.52	73.03	73.41	63.24	<0.0001
Chick Cull ³	1.98	1.54	3.49	3.07	5.31	0.2239
Splay Leg ⁴	3.17	0.77	4.37	4.39	6.28	0.0052
Anomaly ⁵	2.40	0.83	1.23	1.80	2.59	0.7494
Malposition ⁵	2.40	0.83	1.23	3.59	3.02	0.4529

¹Eggs stored at designated temperature for seven days. ²Defined as eggs hatched as a percentage of fertile eggs, determined after breakout by subtracting contaminated, unfertile, and cracked eggs. ³Chicks culled as a percentage of chicks hatched. ⁴Chicks showing signs of splay leg as percentage of chicks hatched. ⁵Occurrence as a percentage of unhatched, fertile eggs.

RESULTS

EGG STORAGE - PHEASANT

Table 2. Effects of egg storage temperature on growout characteristics of pheasants¹

	Temperature (degrees Fahrenheit)					
Measure	50	55	60	65	70	P-Value
Chick Weight (kg) ²	0.020	0.020	0.020	0.020	0.020	0.8435
7 Day Weight (kg) ²	0.042	0.043	0.043	0.043	0.041	0.9783
Feed Conversion Ratio ³	1.887	1.772	1.896	1.806	1.977	0.6942
Mortality (%) ⁴	1.32	1.03	2.90	1.89	2.53	0.3367

¹Eggs stored at designated temperature for seven days. ²Bird weight as pen average.

³Feed weight intake to weight gain. ⁴Culls and mortality after placement compared to number of chicks placed.

CONCLUSION

EGG STORAGE EXPERIMENTS

Pheasant

- Hatch of fertile and spray leg are affected by egg storage temperature (dependent)
 - 55° F is likely best
- Growth measures may not be different between storage temperature treatments

PHEASANT EGG STORAGE EXPERIMENT OVERVIEW



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Thank you!

Questions?



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TITLE: Effects of egg storage temperature on pheasant and quail production
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Commercially produced pheasant and quail are among many poultry species available to consumers. Production systems for non-chicken species successfully utilize a lot of the same management practices, equipment, and business models as chicken production. However, each species has unique biological characteristics that present the necessity for species specific research in order to specialize production practices and increase efficiency. As such, the objective of this study was to investigate the effects egg storage temperature has on two commercially produced species: Ring-Necked (Common) Pheasants, *Phasianus colchicus*, and Coturnix Quail, *Coturnix coturnix japonica*. Eggs from each species were randomly assigned a storage temperature treatment (50, 55, 60, 65, or 70 °F), then maintained within two degrees for seven days of storage. There were two pheasant trials where each treatment consisted of 354 eggs, while the quail study used 1,000 eggs per treatment. At the conclusion of the storage period, eggs were randomly distributed in the same incubator. Hatchability, fertility, and stage of embryonic loss were recorded for each temperature treatment. Chicks were randomly distributed by treatment throughout pens in the same house, with equal number of pens per treatment. Feed and water were provided *ad libitum*, all other specifications provided according to industry standards. Bird weight (by pen) was recorded at placement, day seven, and day ten (for quail). Feed consumption was measured per pen on the same schedule with mortality, culls, and associated weights also recorded. Hatch percentages were evaluated using chi-square tests and performance means were compared using Tukey's Post Hoc Test. Percent hatch of fertile was highest ($P<0.0001$) for pheasant eggs stored at 55 °F (80.5%), quail eggs at 50 °F (90.43%), and lowest at 70 °F (63.2% for pheasant, 83.60% for quail). Incidence of splay leg in pheasant chicks was lowest ($P=0.0052$) for 55 °F (0.77%) and highest for 70 °F (6.28%) storage temperatures. This experiment was conducted at the University of Arkansas Poultry Research Farm. Pheasant eggs were provided by MacFarlane Pheasants, Inc. (Janesville, WI) and quail eggs by Quail International, Inc. (Greensboro, GA).

KEY WORDS: pheasant, quail, egg, storage, temperature