Hatt's • Ranch
producers of top quality game birds
P.O. Box 134
Green River, UT 84525

UtahState University | Cooperative Extension

UTAH GAME BIRD HEALTH AND MANAGEMENT SYMPOSIUM

Green River, Utah
March 8-9, 2013

UTAH GAME BIRD
HEALTH AND MANAGEMENT SYMPOSIUM

March 8-9, 2013
Green River, Utah

March 8 (Friday)

INTRODUCTION & WELCOME

8:00 – 8:15 a.m.	*Royd Hatt*, Hatt's Ranch *Bruce King*, State Veterinarian

BREEDER MANAGEMENT

8:15 – 10:00 a.m. Hatching eggs and breeder management.	*Keith Bramwell* Extension Poultry Specialist University of Arkansas *Lynn Bagley* Moroni Feed Company

HEALTH AND DISEASE

10:00 – 10:15 a.m. *Haemoproteus* in Bobwhite quail	*E. Jane Kelly* Central Utah Veterinary Diagnostic Laboratory Utah State University
10:15 – 10:30 a.m..	Break
10:30 – 11:50 a.m. Intermountain West game bird diseases	*David Frame* Extension Poultry Specialist Utah State University
11:50 a.m. – 12:00 p.m.	

12:00 – 1:00 p.m. . . . . Lunch

1:00 – 1:30 p.m.
Avian influenza in game birds. *Warren Hess*
Assistant State Veterinarian

MANAGEMENT

1:30 – 2:30 p.m.
Game bird management. . . . . *Bill MacFarlane*
MacFarlane Pheasants, Inc.,
Janesville, WI

2:30 – 2:50 p.m.. . . . . Break

2:50 – 5:00 p.m.
Game bird management. . . . . *Bill MacFarlane*
MacFarlane Pheasants, Inc.,
Janesville, WI

DINNER. . . . . TBA
5:30 p.m.

****

March 9 (Saturday)

9:00 a.m. to 12:00 p.m. . . . . Tour of Hatt's Ranch (breeder farm, hatchery, and hunt club)

Utah Game Bird Health and Management Symposium

John Wesley Powell Museum, Green River, Utah March 8-9, 2013

PARTICIPANT INFORMATION

Lynn G. Bagley
Moroni Feed Company
P.O. Box 368
Moroni, Utah 84646

Dr. Lynn Bagley received his BS degree from Utah State University, MS degree from Brigham Young University, and Ph.D in poultry reproductive physiology from North Carolina State University. He has been employed by Hybrid Turkeys, Inc., Tar Heel Turkey Hatchery (part of Carroll's Foods), Utah State University, Diamond V Mills, and Moroni Feed Company. Dr. Bagley currently serves as head of turkey health programs for Moroni Feed Company.

R. Keith Bramwell
Center of Excellence for Poultry Science
University of Arkansas
Fayetteville, AR 72701
Phone: 479-841-6498
bramwell@uark.edu

Dr. Bramwell serves as the Extension Reproductive Physiologist at the University of Arkansas. He received his B.S. in Animal Science from Brigham Young University in 1989, an M.S. in Poultry Science from the University of Georgia in 1991, and completed a Ph.D. in Poultry Science from the University of Georgia in 1995.

The main areas of his professional interest are focused on various areas of the poultry industry as they relate to reproduction and hatchery management.

His areas of research include the many factors (both management and physiological) that influence fertility and embryonic mortality in broiler breeders, specifically on the effects of breeder flock age on the decline in fertility and sperm-egg interaction, hatchability and the associated increases in early embryonic mortality from a commercial perspective. His research also includes studies on hatching egg handling and storage and the effects on hatchability and embryo livability.

David D. Frame
Utah State University Extension
Phone: (435) 283-7586
david.frame@usu.edu

A 1980 graduate of Utah State University with a B.S. in Animal Science, Dr. Frame subsequently received his DVM degree from Oregon State/Washington State Universities in 1984. Dr. Frame completed an avian medicine residency with the University of California, Davis specializing in poultry pathology and diagnostics. He is board certified in the American College of Poultry Veterinarians. Dr. Frame was employed as chief veterinarian for Moroni Feed Company, a commercial turkey cooperative located in central Utah, for almost 12 years before joining the faculty of the USU Animal, Dairy, and Veterinary Sciences Department in 1998 as an Associate Professor. He currently serves as the USU Extension Poultry Specialist with an additional assignment as poultry diagnostician for the Utah Veterinary Diagnostic Laboratory.

Dr. Frame has served on various national boards, including the General Conference Committee of the National Poultry Improvement Plan, an advisory committee to the United States Secretary of Agriculture. He presently serves as editor for the Western Poultry Disease Conference, an internationally renowned poultry disease forum.

A life-long love of birds hallmarks Dr. Frame's career. In earlier years he bred, raised, and showed many different breeds and varieties of exhibition chickens, and has judged local poultry shows for a number of years.

Dr. Frame is married to Lisa Gilbert of Fairview, Idaho and they are the proud parents of two daughters and two sons (none of whom, however, are interested in pursuing a career in veterinary medicine!).

Royd Hatt
Hatt's Ranch
(435) 564-3224
royd@etv.net

Royd Hatt is a lifelong resident of Emery County, Utah having been born and raised in Green River. He and his wife, Toni, are the parents of four children. Royd and his family are owners of Hatt's Ranch game bird ranch. Royd has served as president, vice president, and board member of the North American Game Bird Association.

Warren J. Hess
Utah Department of Agriculture and Food
(801) 870-7818
wjhess@utah.gov

Dr. Warren J. Hess and his lovely wife, Lori, reside in Kaysville, Utah. They have 5 children (3 married), 5 grandchildren, 2 dogs and 4 horses. They love anything to do with family and each other.

Dr. and Mrs. Hess both grew up in Bountiful, Utah and graduated from Bountiful High School. Dr. Hess received his Doctor of Veterinary Medicine (DVM) degree from Colorado State University in 1989. He worked in private practice with a special emphasis in birds and exotic animals until 2004 when he left private practice to work for the Utah Department of Agriculture and Food. He currently serves as Assistant State Veterinarian.

Dr. Hess is a founding member of Utah Emergency Animal Response Coalition, Inc. (UEARC, Inc.), a non-profit 501(c)3 organization that supports efforts statewide to prepare people and communities to address animals in their emergency and disaster response plans. He is a founding board member and current president of the National Alliance of State Animal and Agricultural Emergency Programs (NASAAEP), a national organization that promotes state's interests and best practices in the animals in disasters arena. Dr. Hess sits on a number of national steering committees involved in assisting and guiding USDA and FEMA with their emergency management protocols for animals and animal owners.

Dr. Hess is a past president (2000) of the Utah Veterinary Medical Association (UVMA) and currently serves as chairman of the Disaster Committee in that association. He served for many years in the Boy Scouts of America and enjoyed the association with the up and coming generations. He is actively involved in his neighborhood and church community.

E. Jane Kelly
Veterinary Diagnostician, Bacteriology Section Head
Central Utah Veterinary Diagnostic Lab
(435) 623-1402

Dr. Kelly was born in Liverpool, England. She received her B.S. (1985) and DVM (1989) degrees from North Carolina State University. Subsequently, Dr. Kelly earned a M.S. degree from Utah State University in 1992. She and her husband, Paul, are the proud parents of two children (Elaine, age 16 and Michael, age 10). She loves hiking, camping, skiing, running marathons, and everything else related to the out-of-doors. Dr. Kelly has been working in the Utah Veterinary Diagnostic Laboratory (UVDL) system since 1991, and serves as the director of the Central Utah Branch Laboratory in Nephi as well as the Bacteriology Section Head for the UVDL.

Bruce L. King
Utah Department of Agriculture and Food
(801) 520-4309
bking@utah.gov

Dr. Bruce L. King was raised in Antimony, Utah on a cattle ranch. He is the third of ten children. He graduated from Piute High School in 1970 and married Valene Oyler in 1975. They have four children, two girls and two boys. After graduating from Colorado State University in 1981 with a Doctors Degree in Veterinary Medicine, he practiced with Dr. Thomas Anderson in Gunnison, Utah for 16 years in primarily a food animal practice. In 1988 he went to work for the Utah Department of Agriculture and Food as a field veterinarian and later as the Assistant State Veterinarian. Dr. King currently serves as the State Veterinarian.

William (Bill) MacFarlane
MacFarlane Pheasants Inc.
2821 South U.S. Hwy 51
Janesville, WI, USA 53546
1-800-345-8348 ext.16
608-757-7884
bill@pheasant.com

Bill MacFarlane owns and manages MacFarlane Pheasants, located in southern Wisconsin. MacFarlane Pheasants was established in 1929 and has grown to be one of the largest pheasant farms in North America. In 2012, MacFarlanes hatched 1.7 million pheasants, selling over 1 million of those as day old chicks. MacFarlanes sell mature pheasants, hungarian partridge, chukar partridge and french redleg partridges nationwide. They also produce pheasants for food, processing 150,000 pheasants annually.

Bill grew up working on the farm, then left and got an Economics degree from the University of Houston. Bill returned to the farm in 1979 and worked with his dad Don until Don's death in 1985.

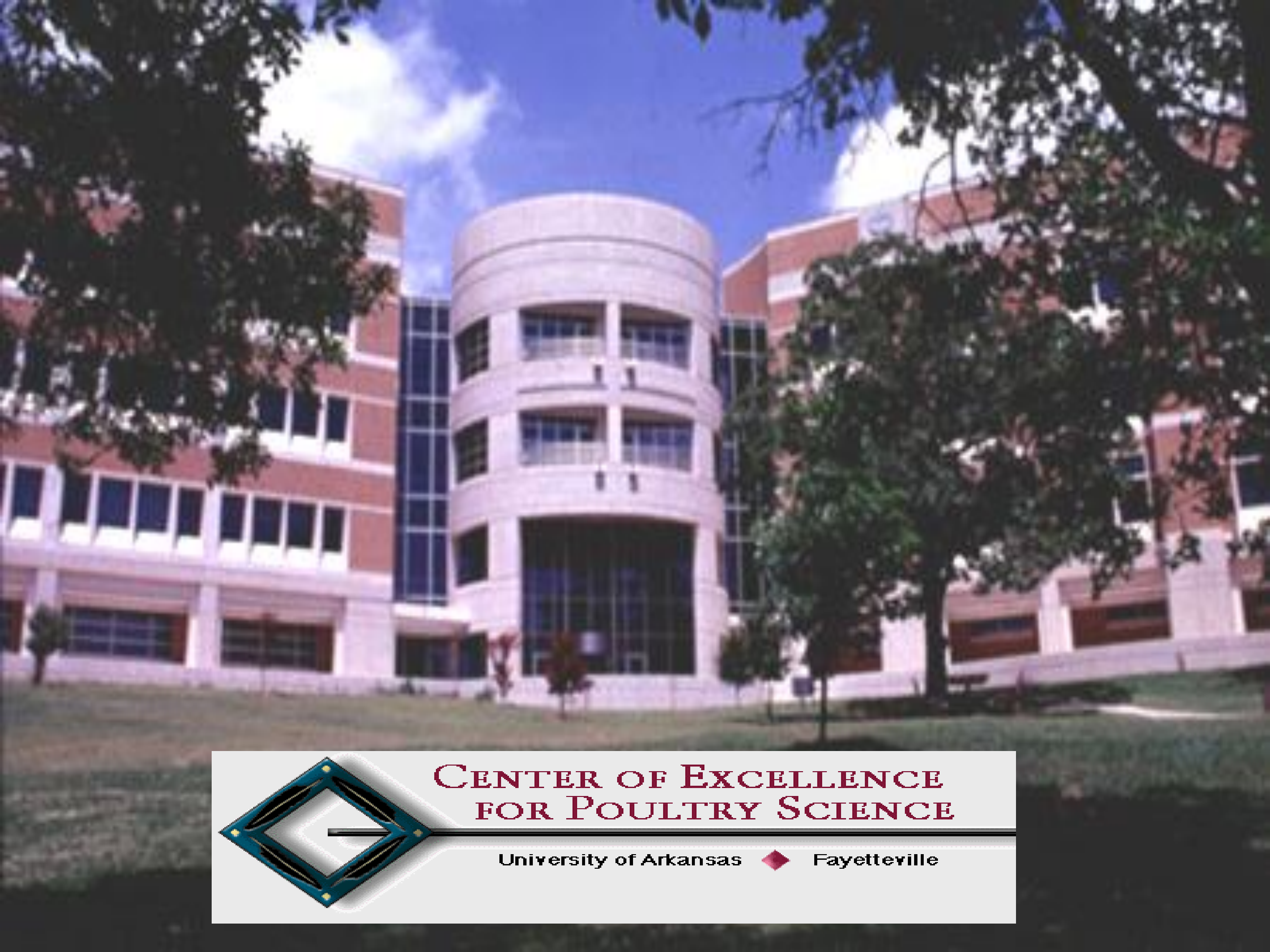
Bill is married to Dori and they have five children. Bill most enjoys the marketing aspect of the pheasant business and oversees the farm's websites www.pheasant.com, www.pheasantfordinner.com, a forum at www.gamebirdforum.com and he writes a blog at www.gamebirdexpert.com. The farm also actively promotes the farms using E-Blasts, Facebook, Twitter and Pinterest. He is on the Board and a past president of the North American Gamebird Association.

Incubation & Embryology

Utah Game Bird
Health and Management Symposium
March 8-9, 2013

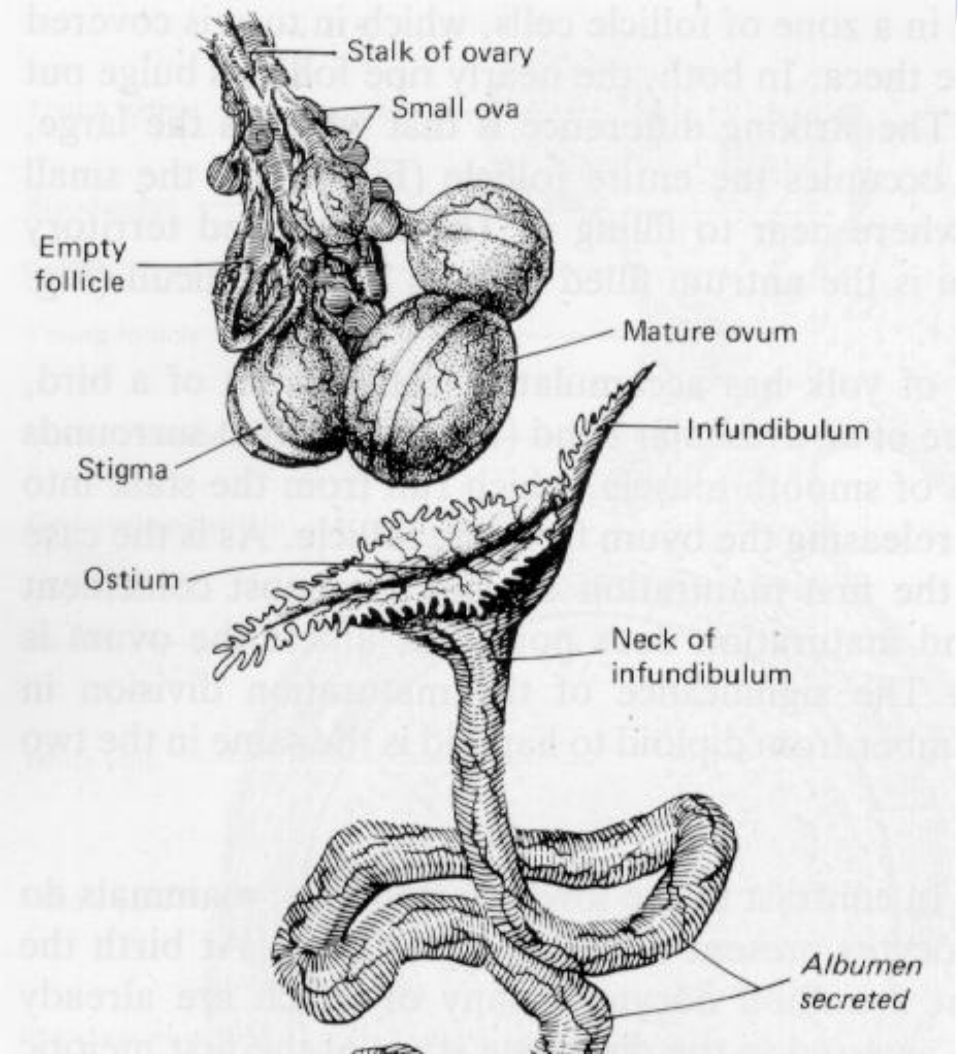


R. Keith Bramwell, PhD
Extension Breeder/Hatchery Management
Department of Poultry Science
The University of Arkansas


CENTER OF EXCELLENCE
FOR POULTRY SCIENCE
University of Arkansas
Fayetteville

Fertilization

- Location - infundibulum
- Funnel shaped - acts to engulf ovum



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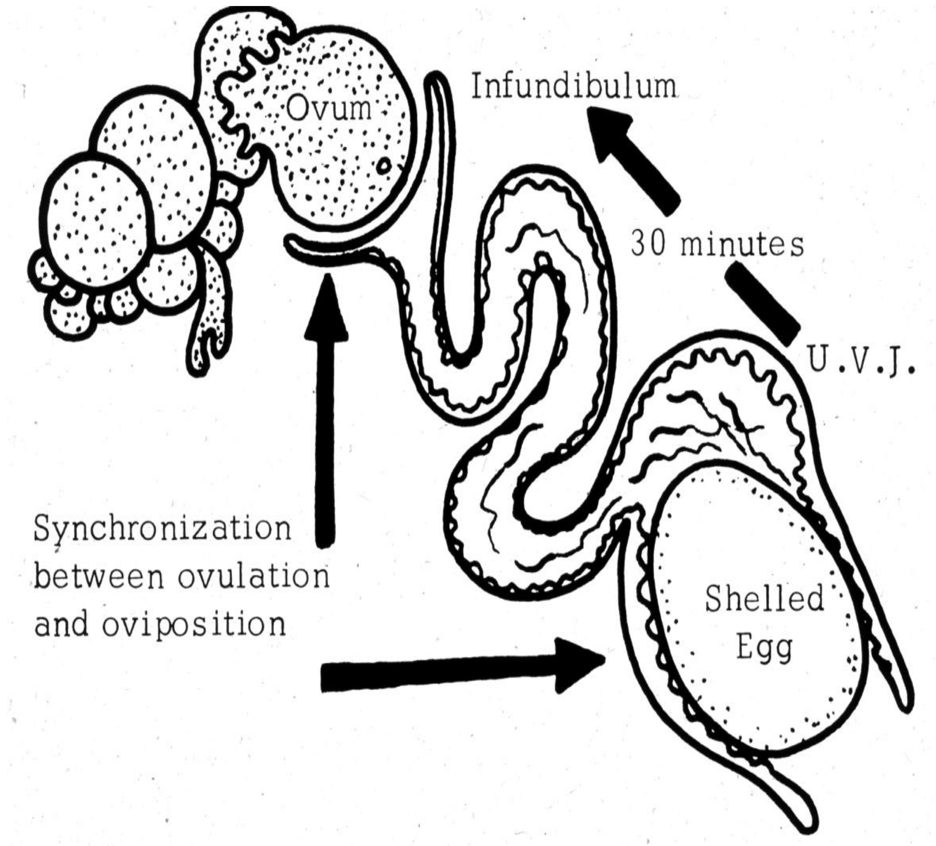
Fertilization

- Fertilization occurs < 5 minutes after ovulation
- Capture of ova is not necessarily a result of ovulation
- Ova present ~ 15 minutes (in chickens)



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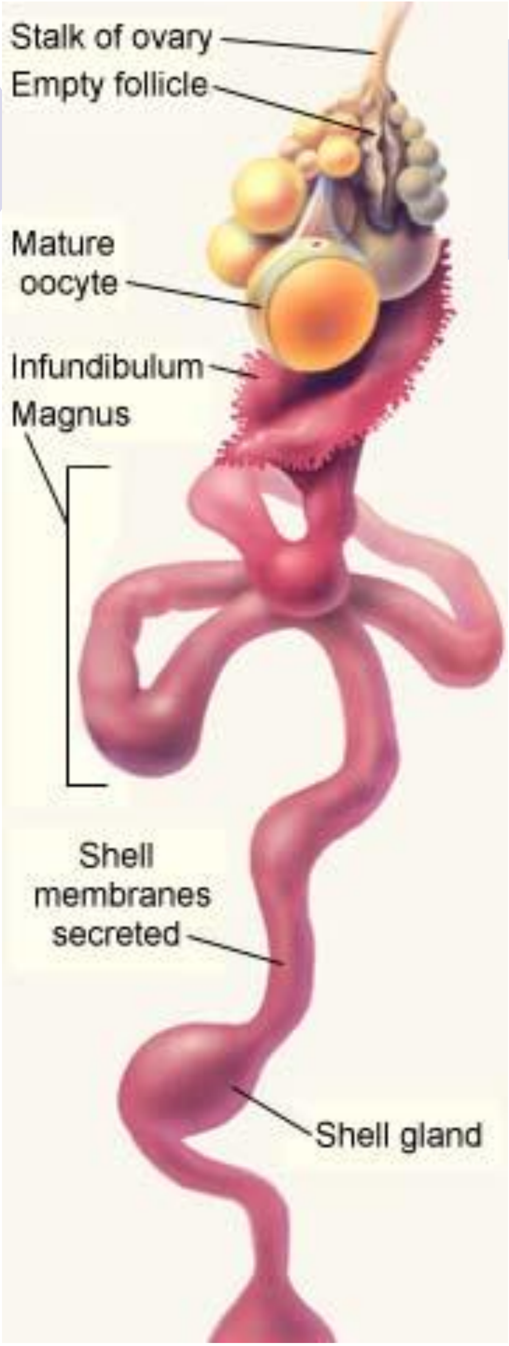
Fertilization

- Shell formation takes 24-26 hours to complete
- Hen’s body temperature 104 - 106º F



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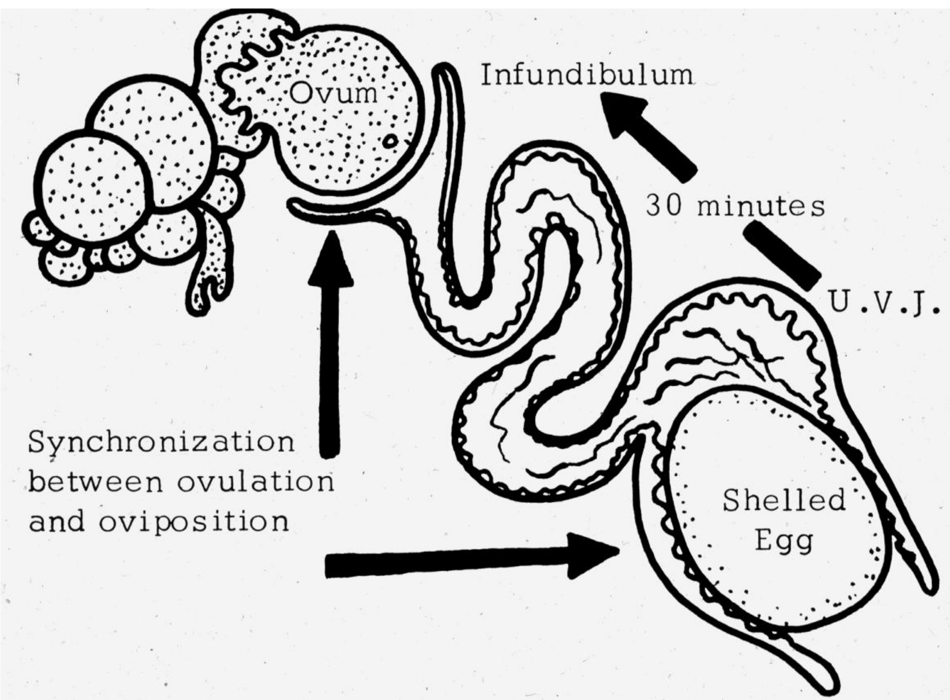
Sperm Cell Storage

- A biological necessity to produce fertile eggs in the avian system



Fertile and Infertile Eggs

Infertile egg

Fertile egg

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Fertilization & Embryo Development

- Fertilization occurs within 5 minutes after ovulation
- Shell formation takes 24-26 hours to complete
- Hen's body temperature 104 - 106º F
- A laid egg represents 1 days embryonic growth (20,000 - 40,000 cells)

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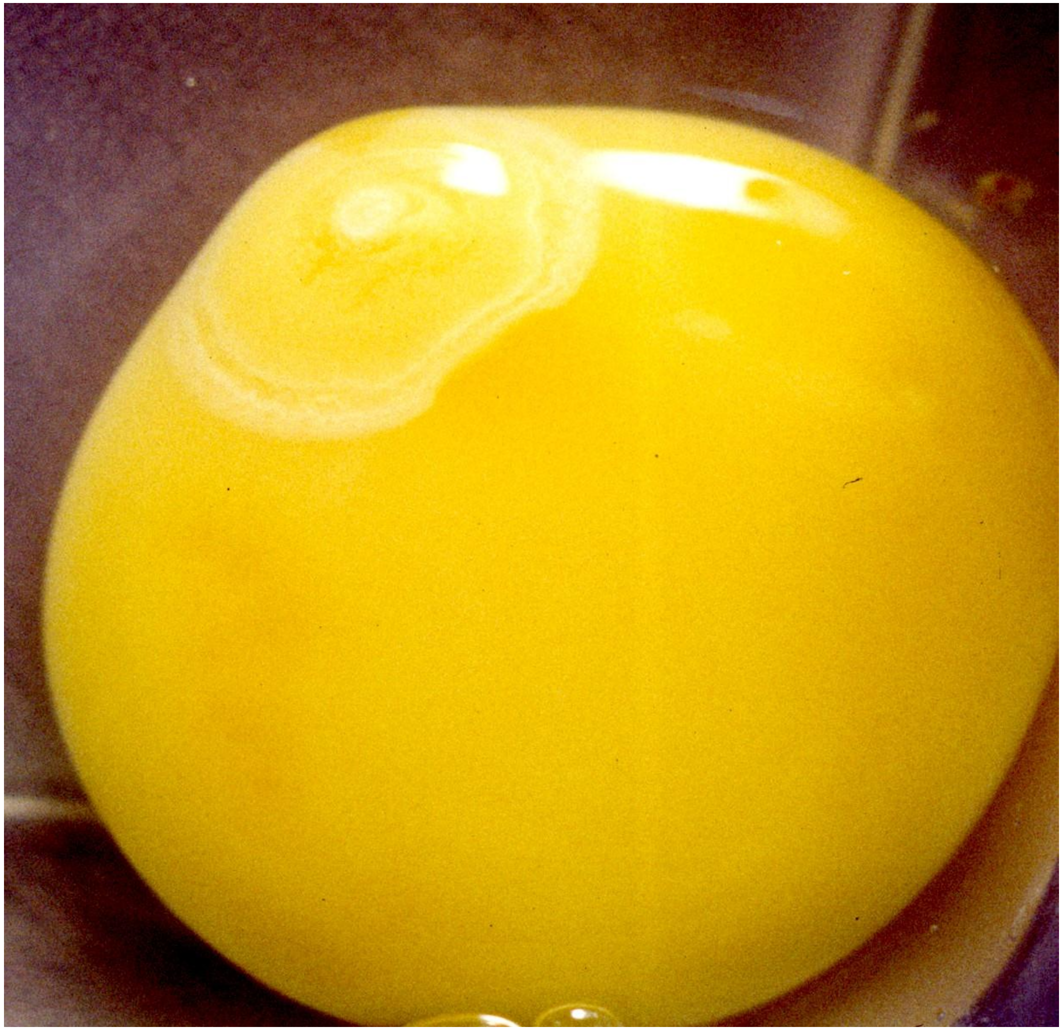
Fertile Eggs

- 12 hours of development

Fertile Eggs

- 24 hours of development



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7154
7009
7628
8062

Egg Handling

- Needs more attention and has a huge impact on hatch of fertile.
- Egg handling starts at the farm and continues until the eggs are set in the incubator.

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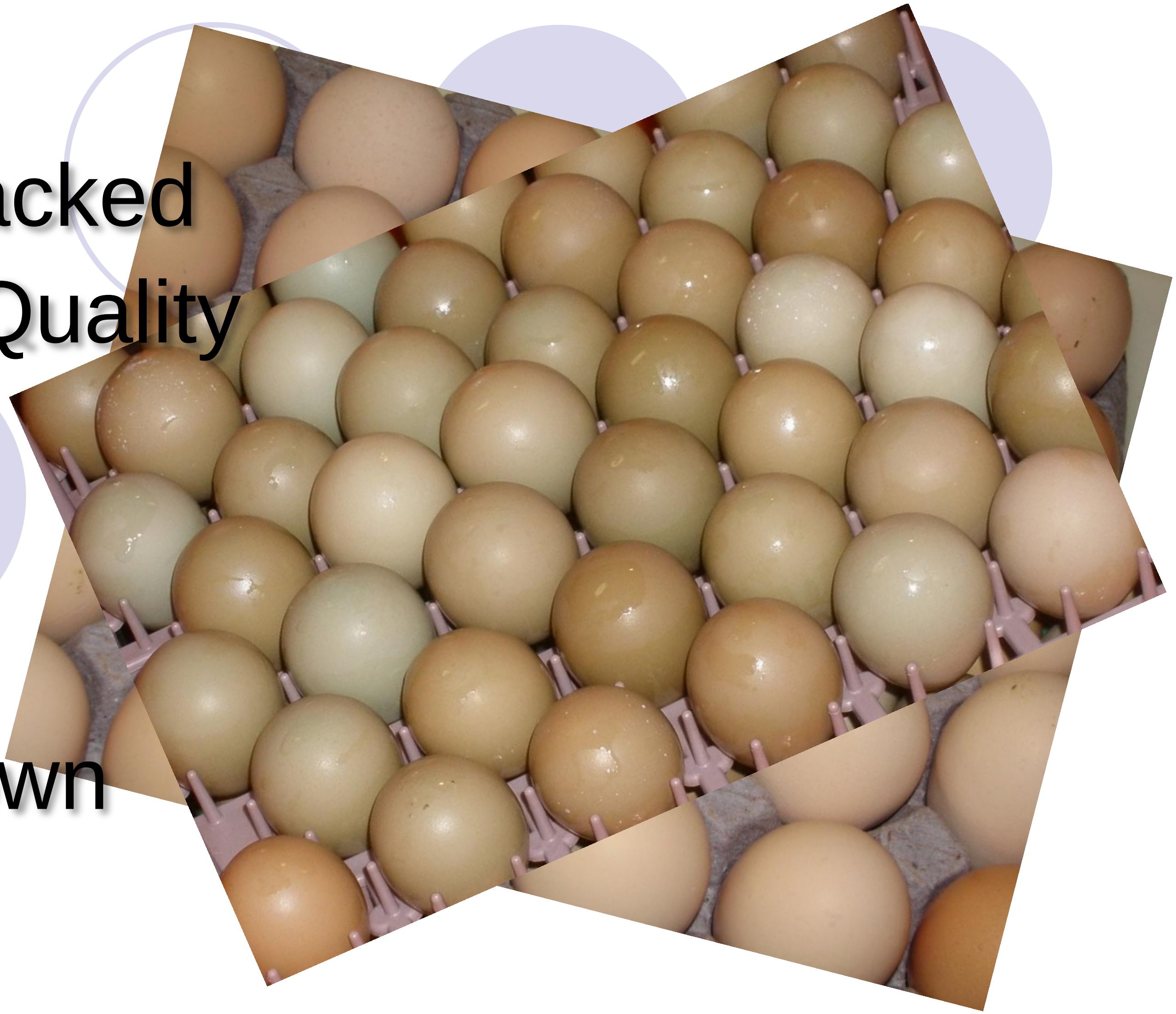
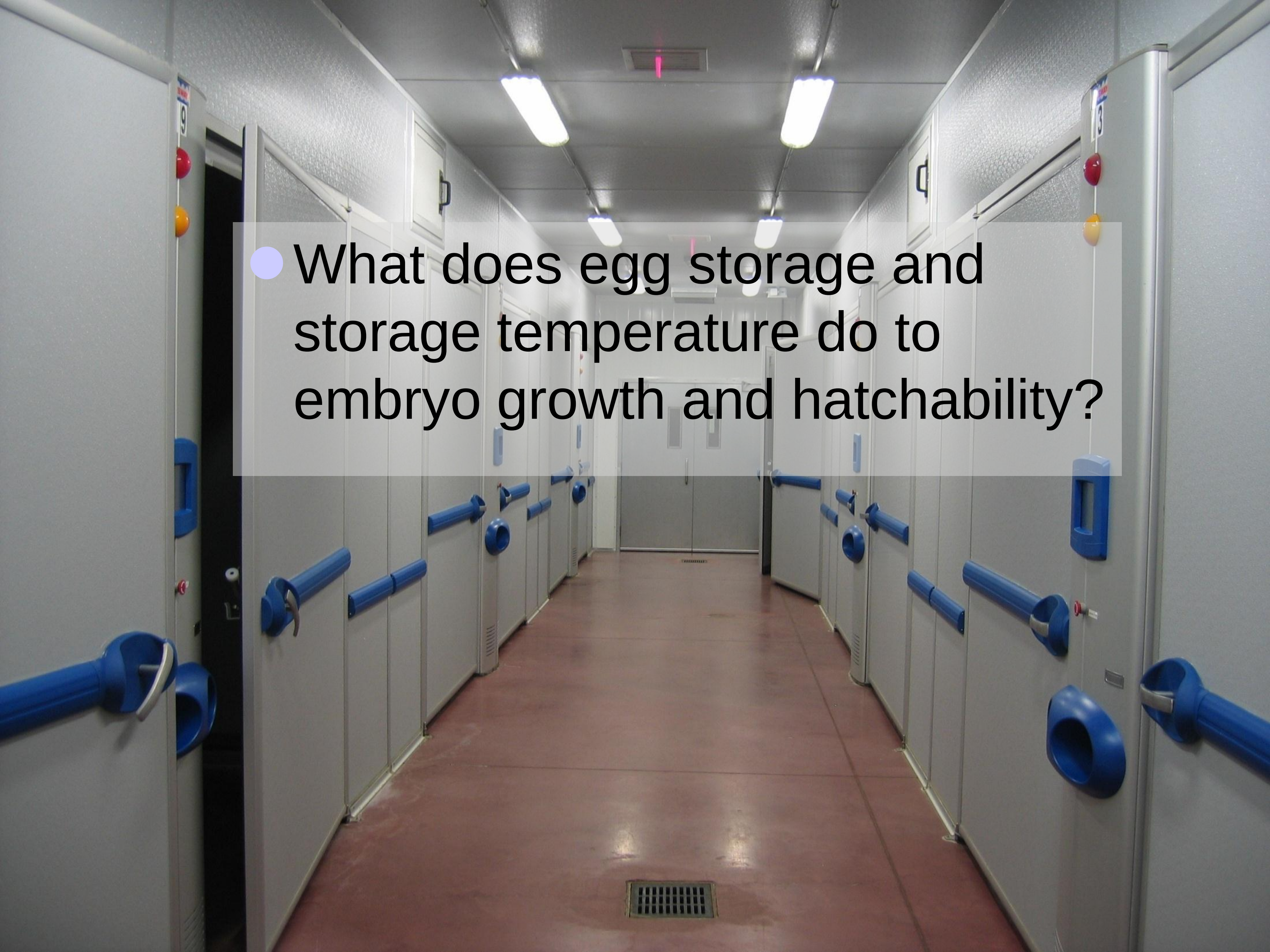
Eggs Evaluated

- Control
- Broken/cracked
- Cull/shell Quality
- Dirty
- Sanded
- Wiped
- Upside Down



Effect of Egg Storage Temperature on Hatchability

Keith Bramwell, Savannah Henderson, Doug Yoho
The University of Arkansas,
Scott Martin, Cobb-Vantress, Inc.



- What does egg storage and storage temperature do to embryo growth and hatchability?

Why Are Eggs Stored?

- Management perspective
  - To obtain sufficient egg numbers from each flock
  - Egg management, to fill machines/orders
- Physiological goals
  - Stop (or slow) embryo development

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Effects of Egg Storage

- Main effects of storing eggs:
- 1) Prolongs incubation time
  - 1 day storage adds 1 hour to incubation time
- 2) Hatchability depressed with storage
  - After 7 days 0.5 to 1.5% hatch loss per day stored
- 3) Chick quality depressed
  - After 14 days egg storage

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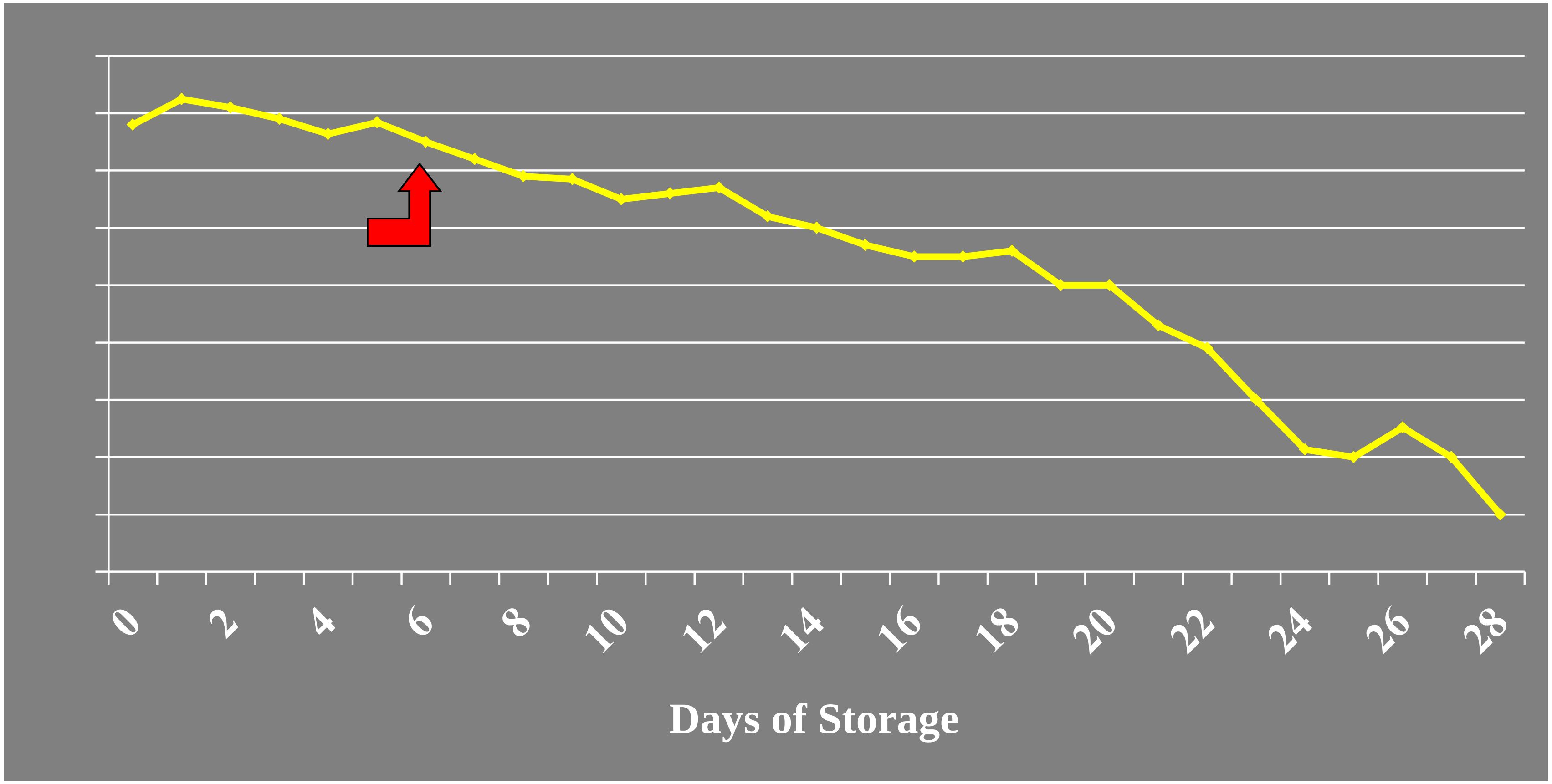
Effect Of Egg Storage On Hatchability



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Purpose of Storing Hatching Eggs

- "Arrest" embryo development
- "Physiological Zero" - The temperature at which embryonic development stops, or is appreciably decreased
- In order for embryonic development to be virtually stopped, on-farm egg coolers are typically set between 63°F and 70°F

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Embryo Development
(Germinal Disc Size in mm)

Storage time	75.0 °F	80.0 °F	85.0 °F	90.0 °F	100 °F
24 hr	**4.96**	5.44	6.01	7.41	12.29
48 hr	**4.78**	6.08	10.19	15.48	-
72 hr	**4.87**	6.54	16.68	28.23	-
96 hr	**4.86**	9.13	22.62	38.96	-

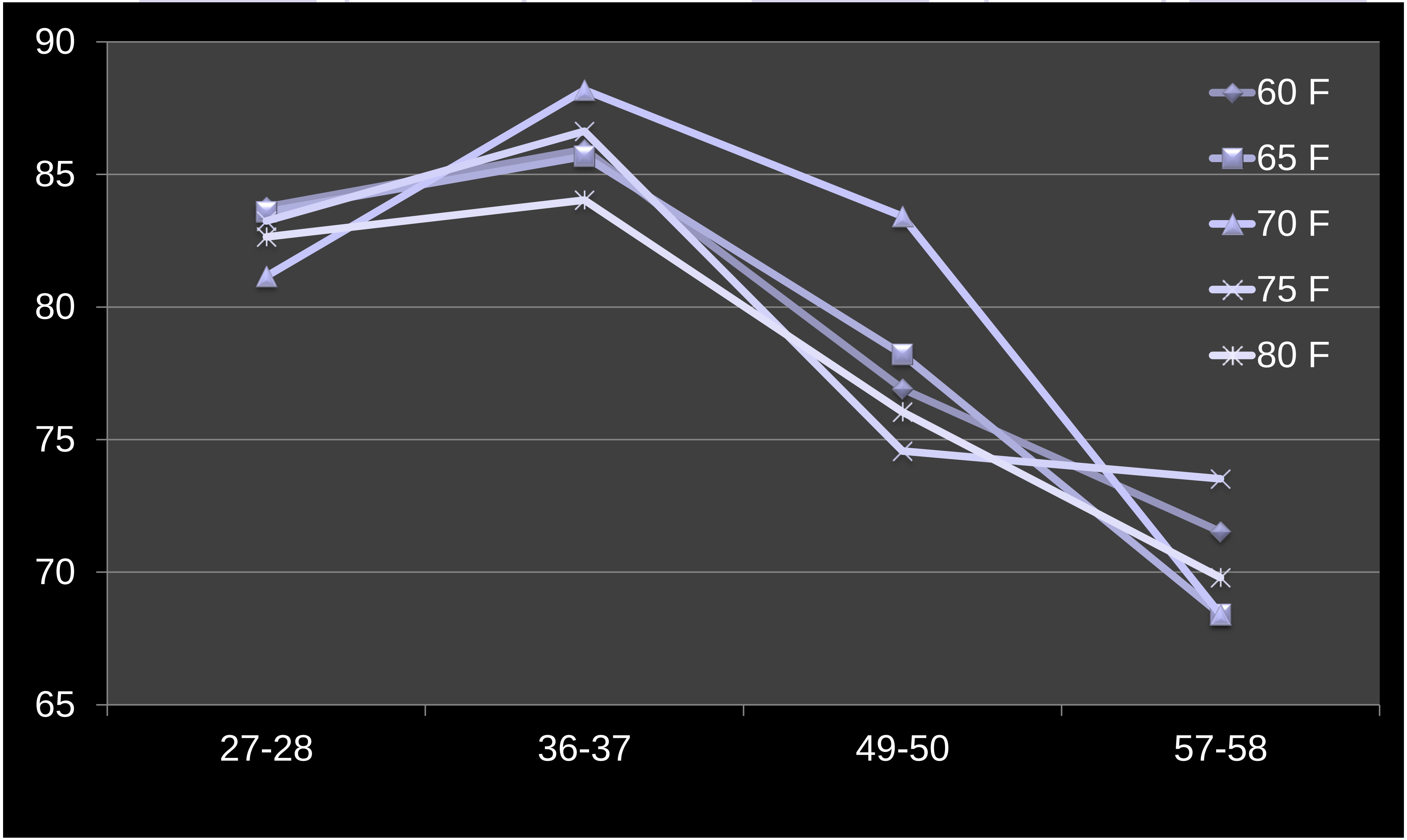
1 mm

Time Required to Cool Eggs From 100ºF (37.8ºC) to 65ºF (18.2ºC)

Sealed Egg Cases	Egg Cases with Holes in Side	Wire Baskets	Incubator Egg Trays
4-5 days	1-2 days	1 day	¾ day

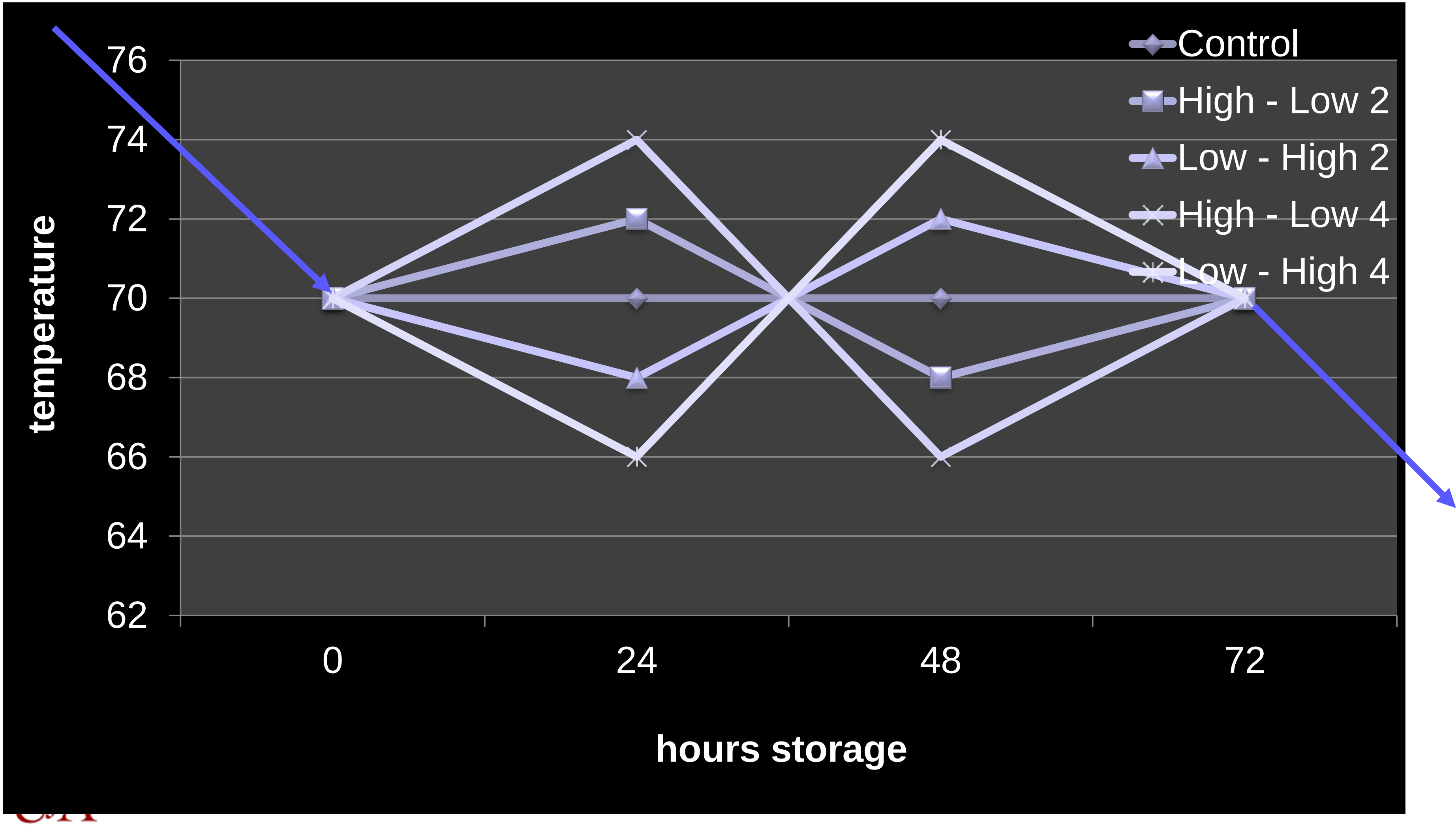
Commercial Chicken Production Manual

Hatchability



- What does variations in on-farm hatching egg storage do to hatchability?

Fluctuating Egg Storage Temperature



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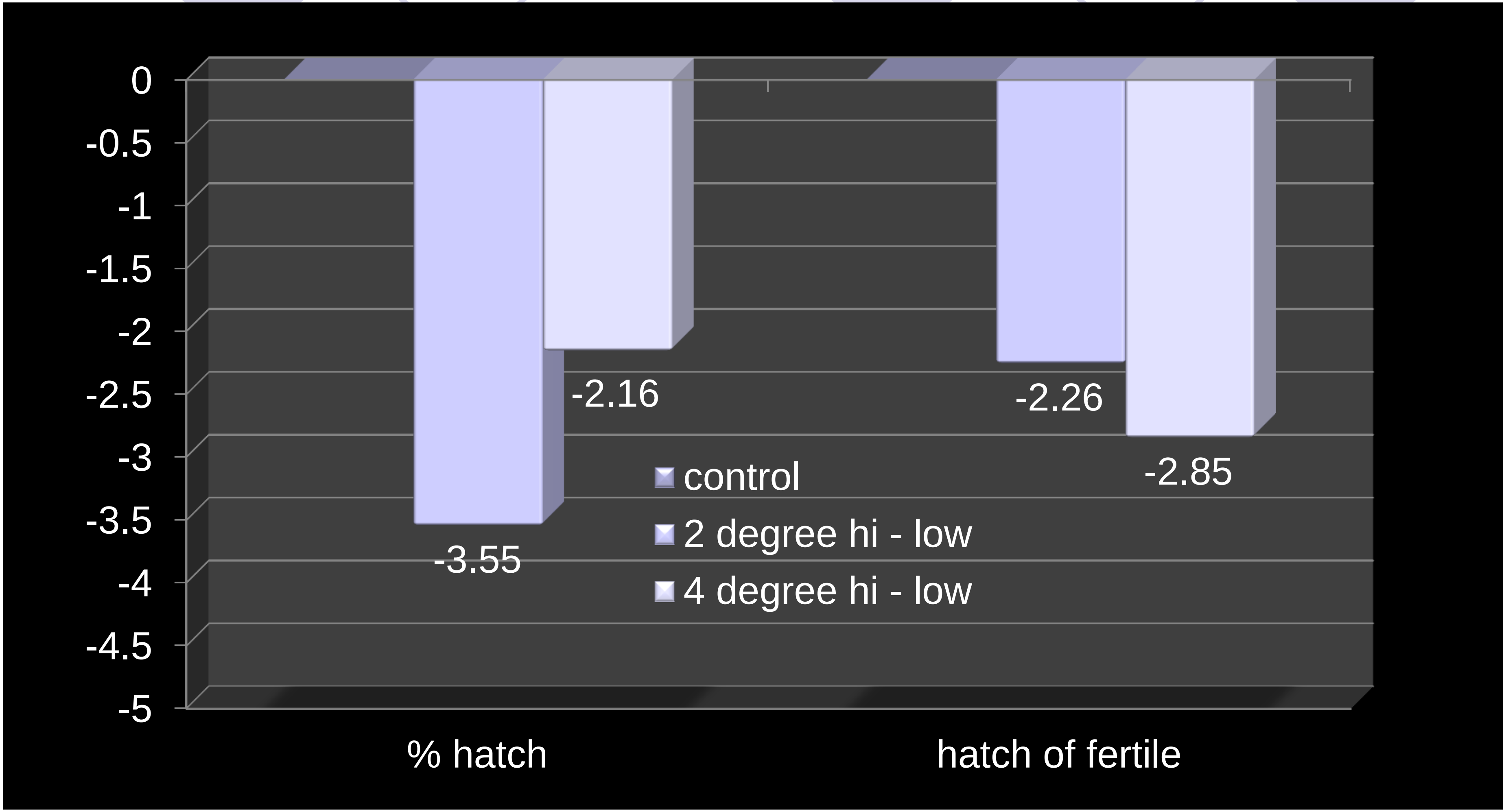
Hatch Loss Caused by Storage Temperature



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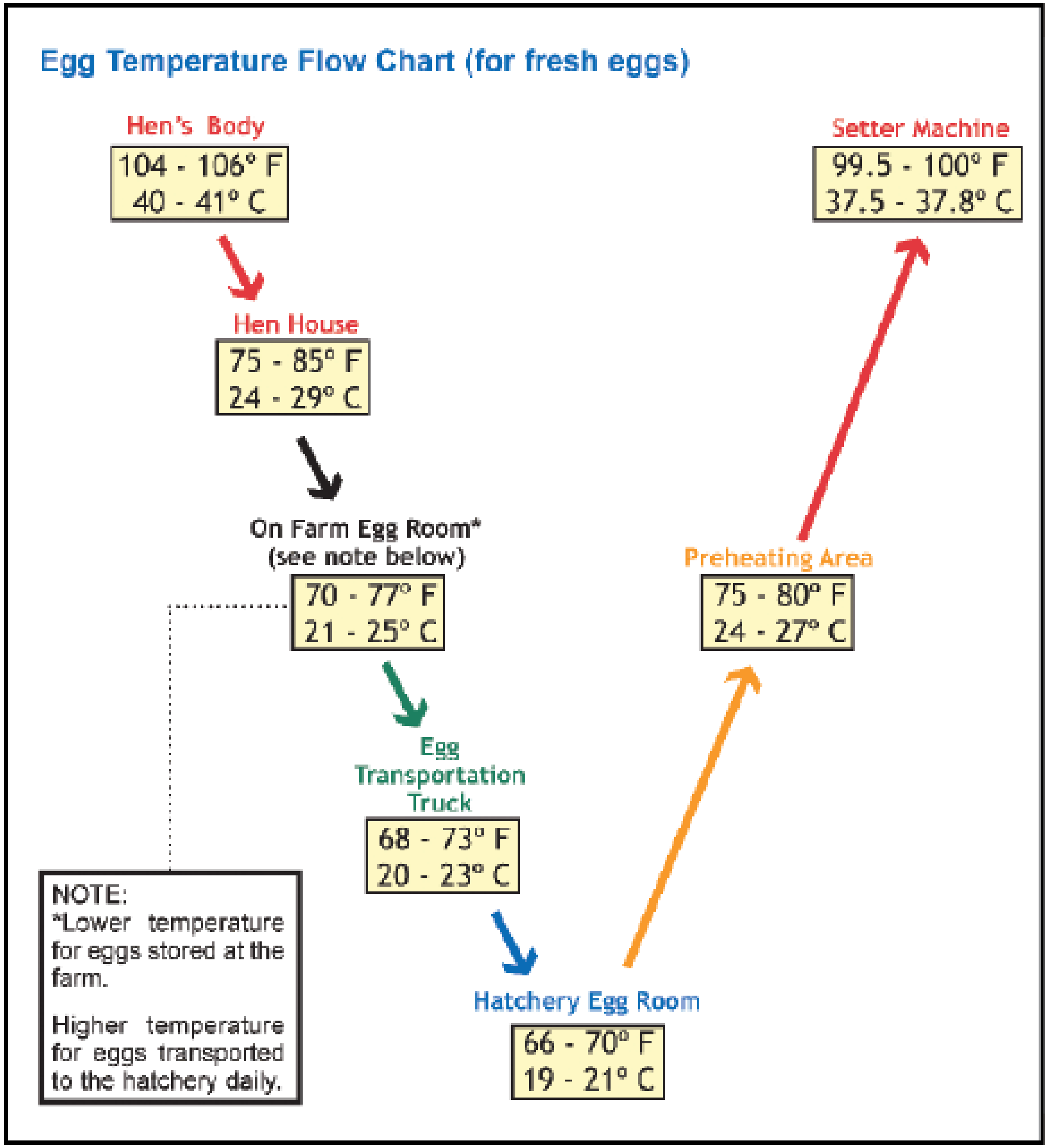

While the industry recommends storage temperature of 20 C, actual on-farm storage temperature can range from 15.6 C to 23.9 C.

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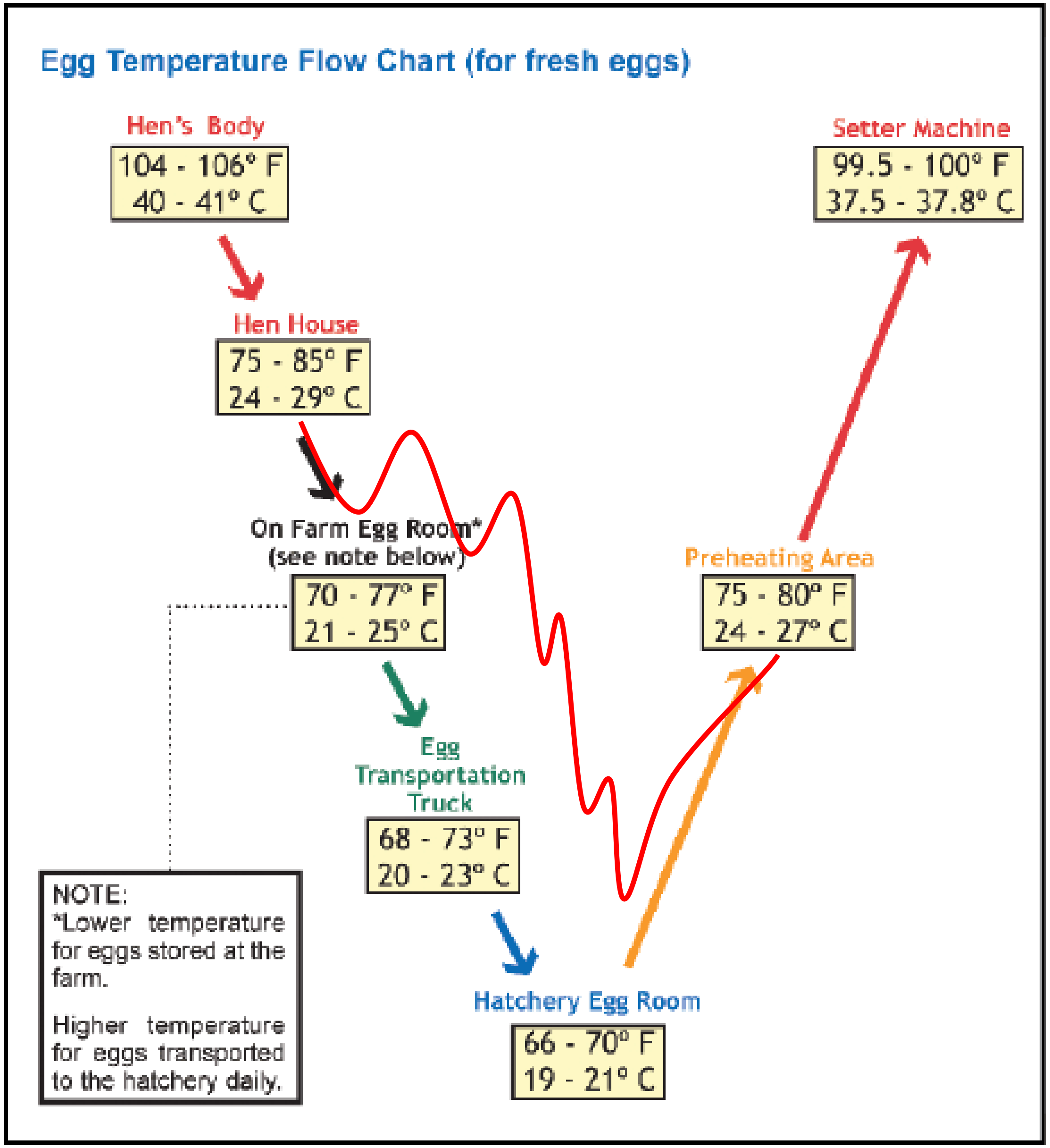

While the industry recommends storage temperature of 20 C, actual on-farm storage temperature can range from 15.6 C to 23.9 C.

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Data Loggers

- An important tool today is following egg room temperatures with data loggers.
- Data loggers can also follow temperature in the nest and belt.
- Many problems have been solved using data loggers to correct fluctuations or re-insulate farm coolers.

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Summary

- Most hatchability problems are a result of poor fertility
- However, when egg production is attained, and the flock maintains high levels of fertility, how we care for hatching eggs can have a tremendous effect on the overall hatchability

Incubation and Hatchery Management

Keith Bramwell, PhD
Department of Poultry Science
The University of Arkansas

In the Beginning . . . The Small

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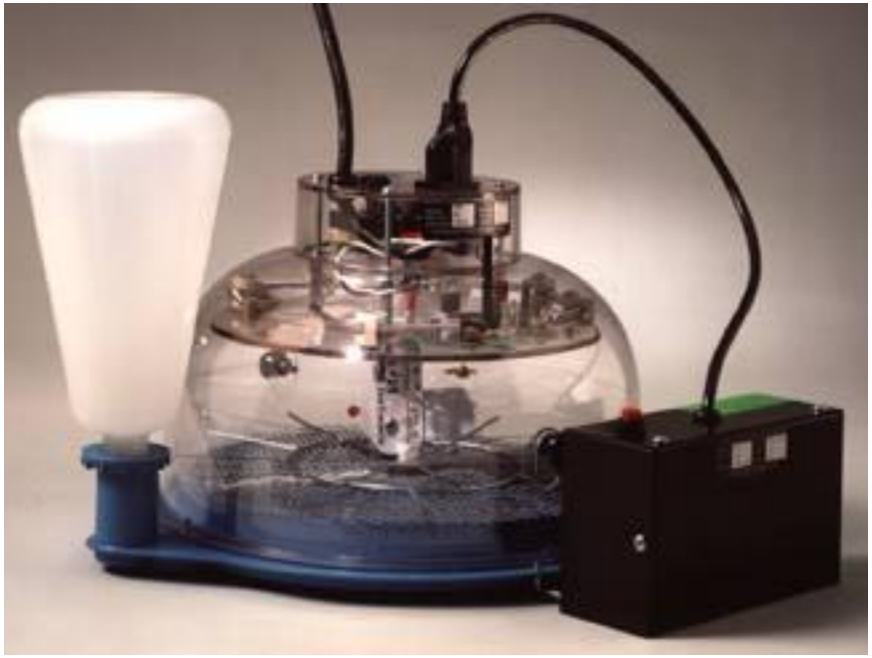
Small to Medium . . .
The Dome Style



Medium Sized . . .
Table Top Style

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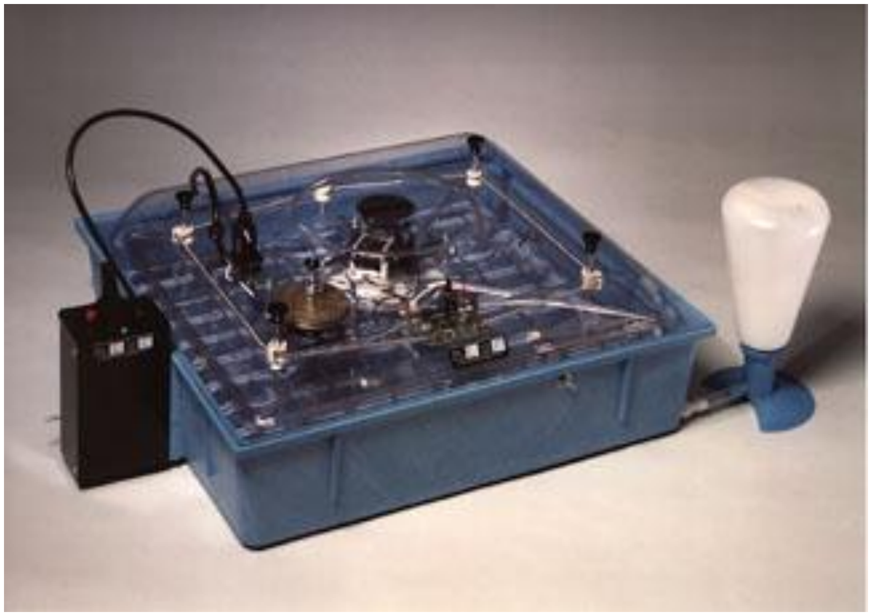
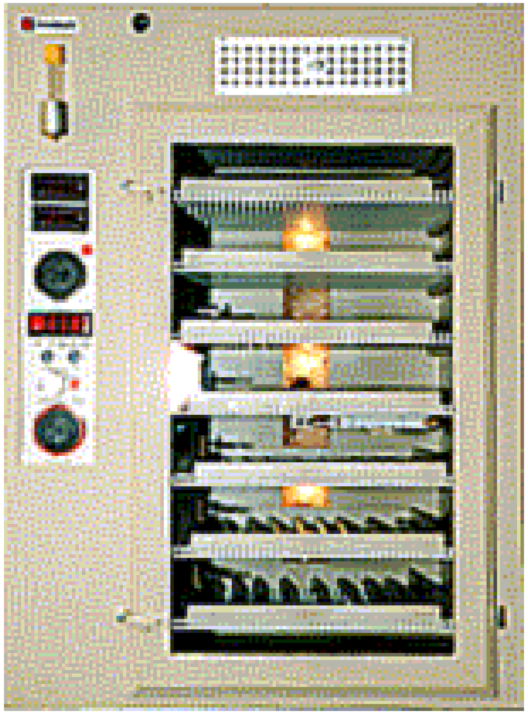
Medium Sized . . .
Table Top Style



Large Sized . . . . Cabinet Style



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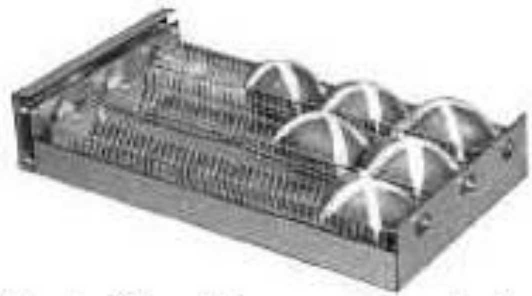

Rack with rotating emu egg baskets

Rack with rotating goose egg baskets
(can also be used for peafowl)


EGGS
Broiler Hatching
EGGS
05.02.2006


2B
05.02.2006


05.02.2006


Natureform
2
Natureform
3
Natureform
4

At the End ? . . .
The Extra Large

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EXIT


JAMESWAY

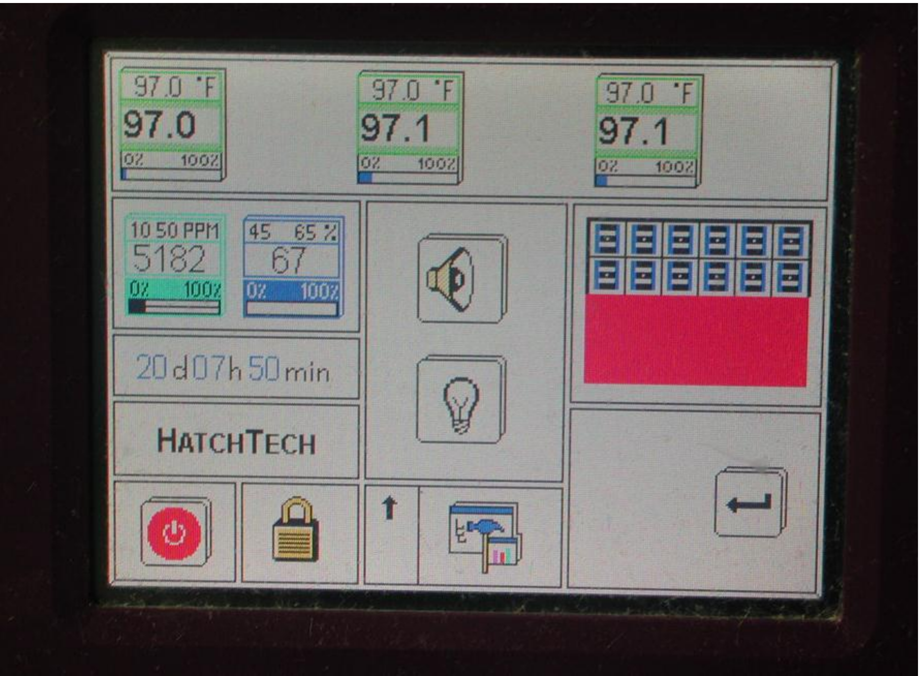

04


04/10/2008


04/10/2008

Introduction

- Advances in hatchery and incubation technology and the equipment available continues to improve and provide opportunities previously unavailable



Introduction

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Incubation Time

- Three factors influence incubation time:
- 1) Temperature of incubation
  - Somewhat fixed, but can be adjusted for age of flock, hatchery equipment, etc.
- 2) Age of eggs
  - Stored egg take longer to incubate (add 1 hour per day storage)
- 3) Size of the eggs
  - Larger eggs take longer to incubate

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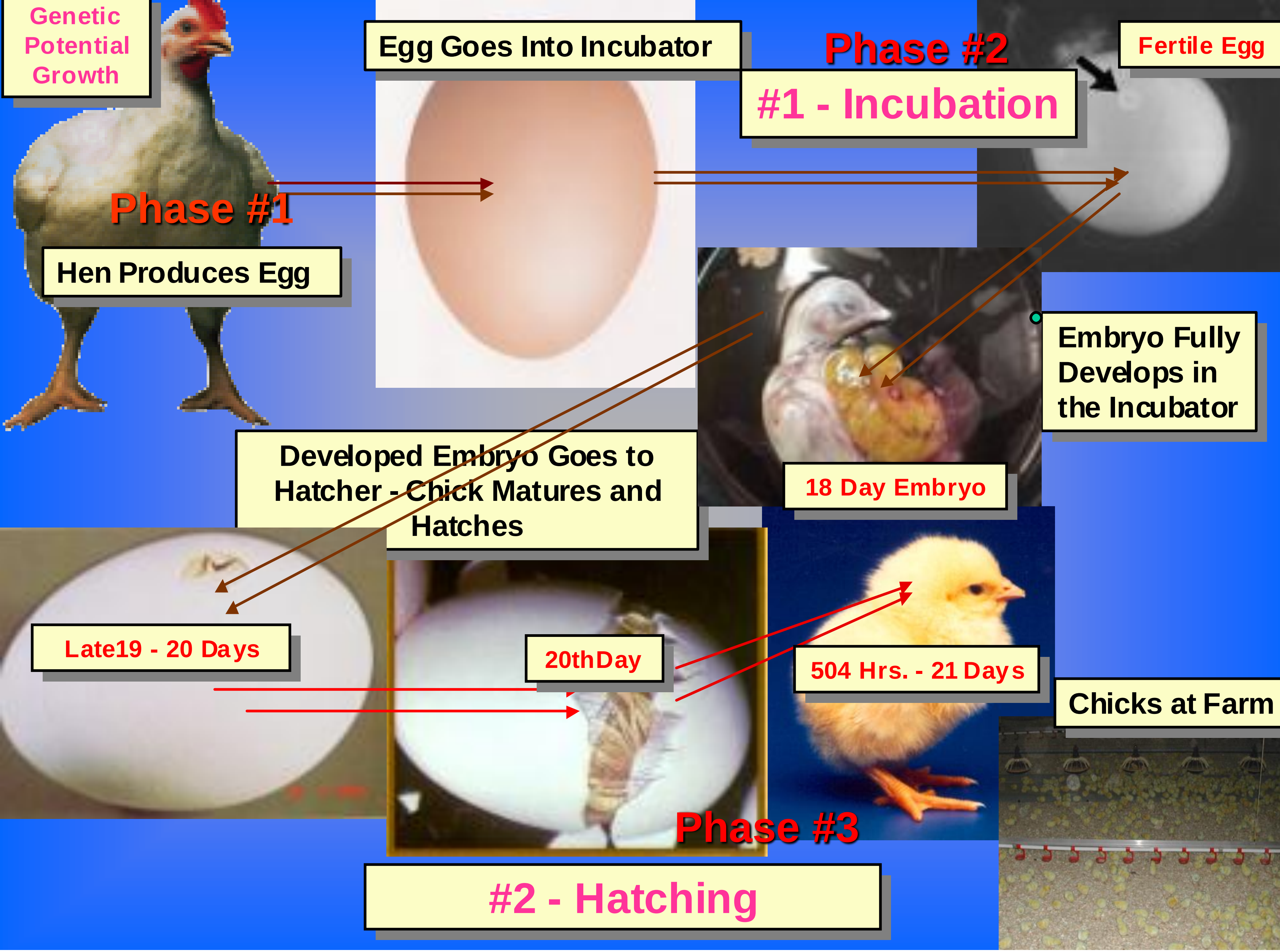
Setter Operation

- Requirements for incubation (embryo growth)
  - Correct temperature (~ 98.0 – 100.3 F)
  - Correct humidity (~ 54%, ~ 82 F wet bulb)
  - Adequate gas exchange (~ 12% weight loss)
  - Regular turning of eggs (~ 1 x per hour)


Genetic Potential Growth
Egg Goes Into Incubator
Phase #2
Fertile Egg
#1 - Incubation
Phase #1
Hen Produces Egg
Embryo Fully Develops in the Incubator
Developed Embryo Goes to Hatcher - Chick Matures and Hatches
18 Day Embryo
Late19 - 20 Days
20thDay
504 Hrs. - 21 Days
Chicks at Farm
Phase #3
#2 - Hatching

Setter Operation

- There are three types of commercial incubation systems
  - Multi-stage fixed rack
  - Multi-stage buggy loading
  - Single-stage buggy loading

Incubation Types

- Three main types of machines:
- 1 Multi-stage fixed rack
-
-

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Incubation Types

- Three main types of machines:
-
- 2 Multi-stage buggy loading
-

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Incubation Types

- Three main types of machines:
-
-
- 3 Single-stage buggy loading

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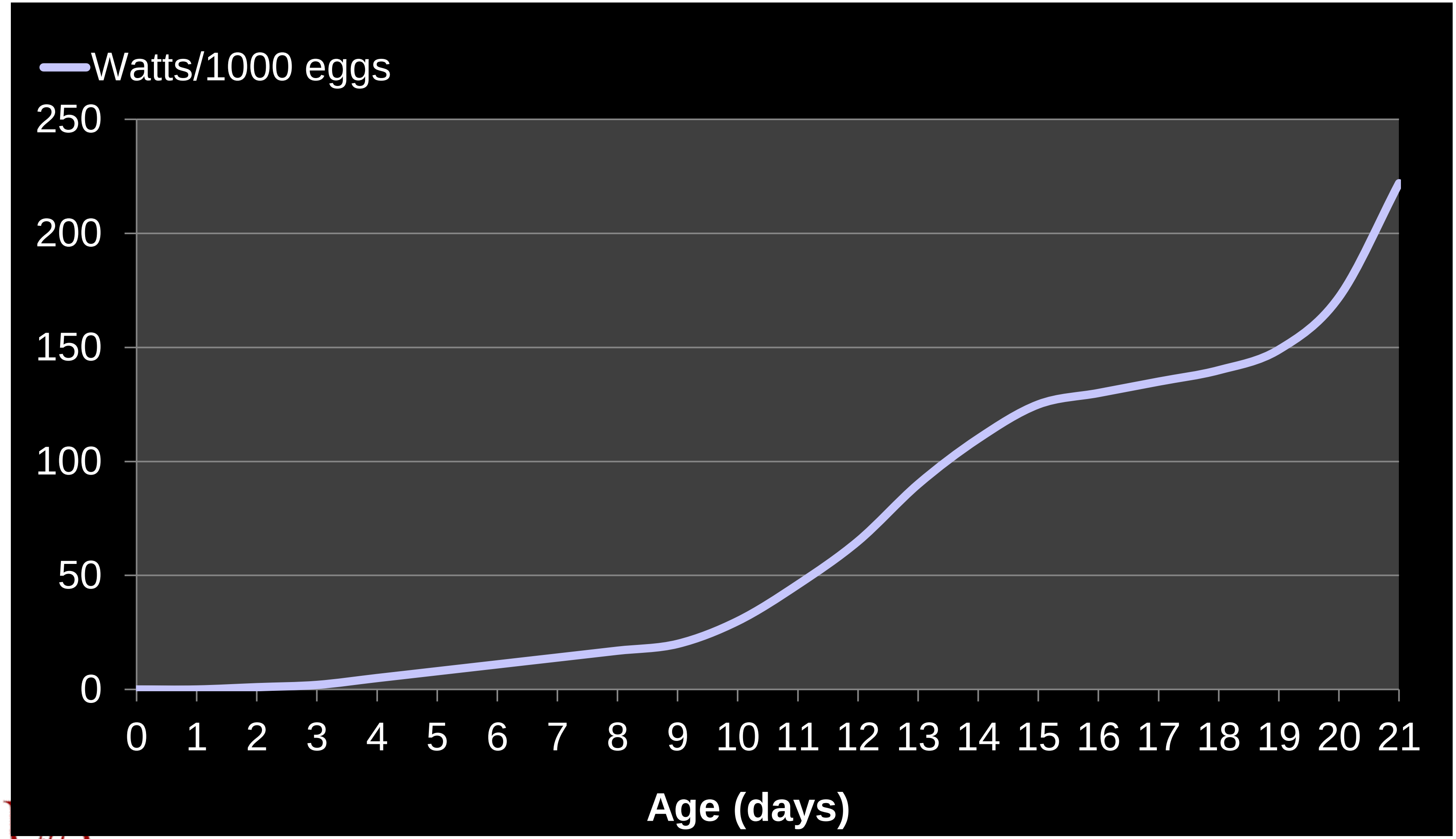
Heat Production of Incubating Eggs



Incubator Profile July 2008				
Day/Hr	Temperature	Humidity	Damper %	Damper CO2
0.00	100.3F	70%	0	
3.00	1003.F	70%	0	
4.00	100.1F	70%	0	
6.00	100.0F	70%	0	
8.00	99.9F	67%		10000 PPM
9.00	99.8F	65%		10000 PPM
10.00	99.7F	60%		4000 PPM
10.09	99.6F	55%		4000 PPM
10.18	99.5F	50%		4000PPM
11.03	99.4F	45%		4000 PPM
11.12	99.3F	45%		4000 PPM
11.21	99.2F	45%		4000 PPM
12.06	99.1F	45%		4000 PPM
12.15	99.0F	45%		4000 PPM
13.00	98.9F	45%		4000 PPM
13.09	98.8F	43%		4000 PPM
13.18	98.7F	42%		4000 PPM
14.03	98.6F	42%		4000 PPM
14.12	98.5F	42%		4000 PPM
14.21	98.5F	42%		4000 PPM
15.06	98.4F	42%		4000 PPM
15.15	98.4F	42%		4000 PPM
16.00	98.3F	42%		4000 PPM
16.12	98.2F	42%		4000 PPM
17.00	98.2F	42%		4000 PPM
17.12	98.1F	42%		4000 PPM
18.12	98.0F	42%	100%	

Incubator Set Up

Turn

1. Turn Every 60 Minutes
2. Stop Turn @ Day 15

Humidity

1. Humidity on @ Day 10
2. Dehumidifier on @ Day 10
3. Auto Damper Off

Fans

Hold	0 – 1	1 – 3	3-10	10-14	14+
40%	100%	75%	90%	100%	100%

CO2

1. Span Conc. @ 5000 PPM
2. Min. Damper @ 15%
3. Hysteretic @ 300 PPM
4. High CO2 @ 12000 PPM
5. Safety Day @ 10
6. Damper Duty @ 30%

Note: Do Not Pre – Cool Incubator before loading from egg room – Use Dry Down Mode – Set Holding Temperature @ 68F and Humidity @ 75% RH

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Ventilation

- Setters draw fresh air from the room they are in and expel CO_2 and excess heat
- Setters have internal humidity and temperature control, but incoming air (from the room or hallway) is pre-humidified and temperature controlled

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Temperature Control

- Temperature determines the metabolic rate and development of the embryo
  - Multi-stage incubation - temperature remains constant
  - Single-stage incubation – temperature can be altered to best stimulate growth. Starting with a higher temperature then reduced thereafter. (incubation profiling)
  - Temperature variations due to incorrect loading will create incubation problems

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Humidity

- Egg shell contains pores from which water vapor is lost from the egg during incubation
- Humidity can control the moisture loss
- Approximately 12% weight loss should occur by 18 days incubation
  - Weigh eggs at day 0, and weigh the same eggs again at 18 days.

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Turning

- Eggs musts be turned during incubation about ~ 1 time per hour (3 or 5 x per day)
- Prevents embryo from sticking to membranes of the shell and aids in development of embryonic membranes
- Necessary first 2/3 of incubation period

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Egg Transfer

- Eggs are transferred from the setter to the hatcher at 20-21 days of incubation for several reasons
  - 1) To lay eggs on their side to allow freedom of movement during the hatching process
  - 2) Better hygiene as fluff from hatched chicks and eggs is contained in hatchers and hatcher halls, this helps reduce contamination
  - 3) Eggs and embryos are sorted and processed at this time

Operation of Hatchers

- Most commercial hatcheries hatch 4 times per week, twice from each hatcher
  - Monday and Thursday
  - Tuesday and Friday
- Hatchers are washed between each hatch to ensure cleanliness
- Construction must be durable to handle these factors

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Operation of Hatchers

- Ventilation & Humidity
  - Initially the same as in the setters
  - As chicks begin to pip humidity rises to keep shell membranes moist
- Temperature
  - Usually slightly lower than in the setters

Success???

- ***Hatchability*** is an indication of the breeder-hatchery program

- ***Hatch of Fertile*** is an indication of the hatchery management

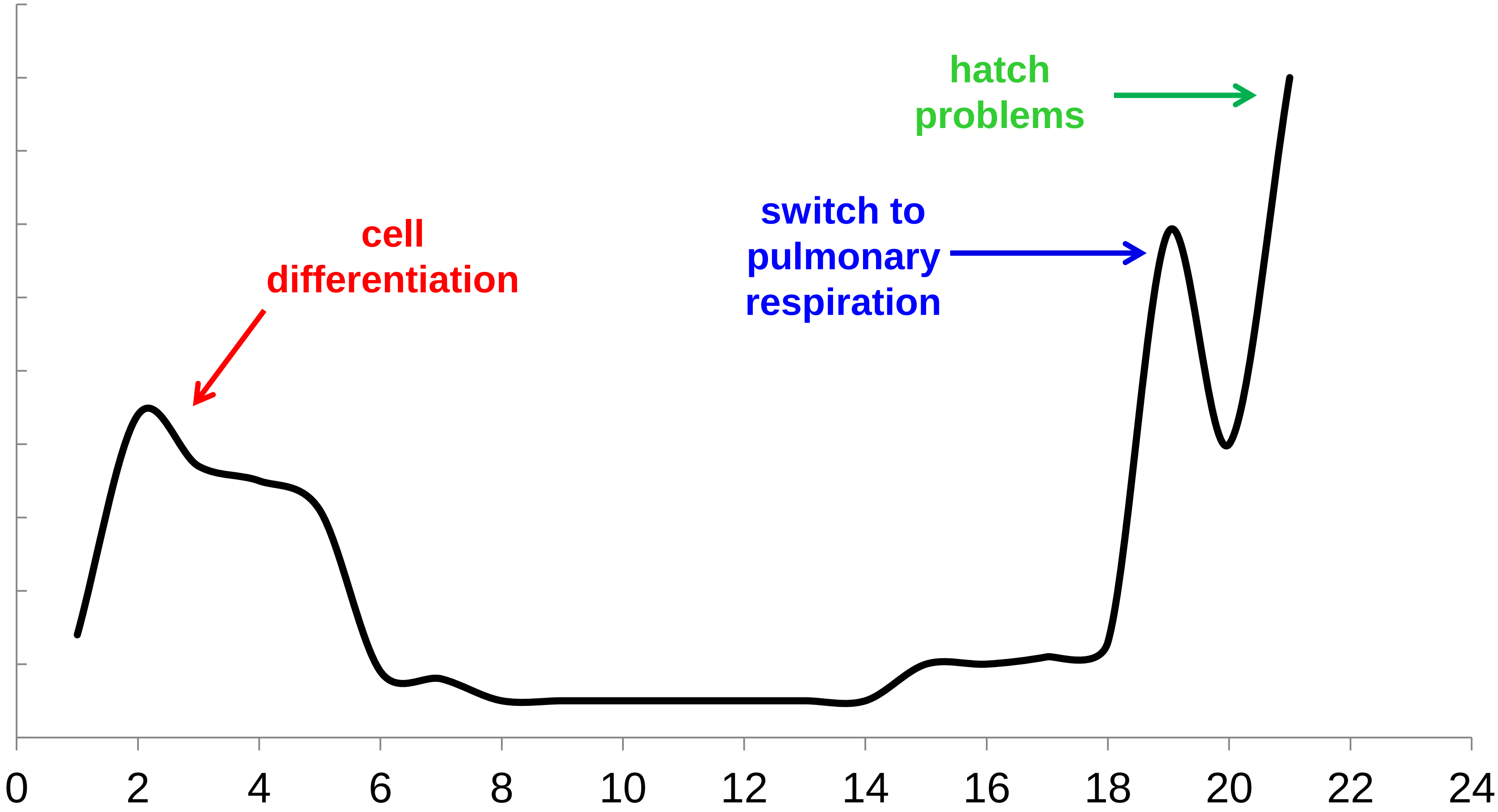
Embryodiagnosis

Keith Bramwell
Department of Poultry Science
The University of Arkansas

Methodology

- Important for managers to have direct knowledge of breakout results
- Managers should monitor candling and breakout procedure routinely and correlate with people doing breakout
- Best if managers can assist on breakouts, especially when problems exist or decisions are to be made based on breakout

Percent Mortality of Fertile Eggs



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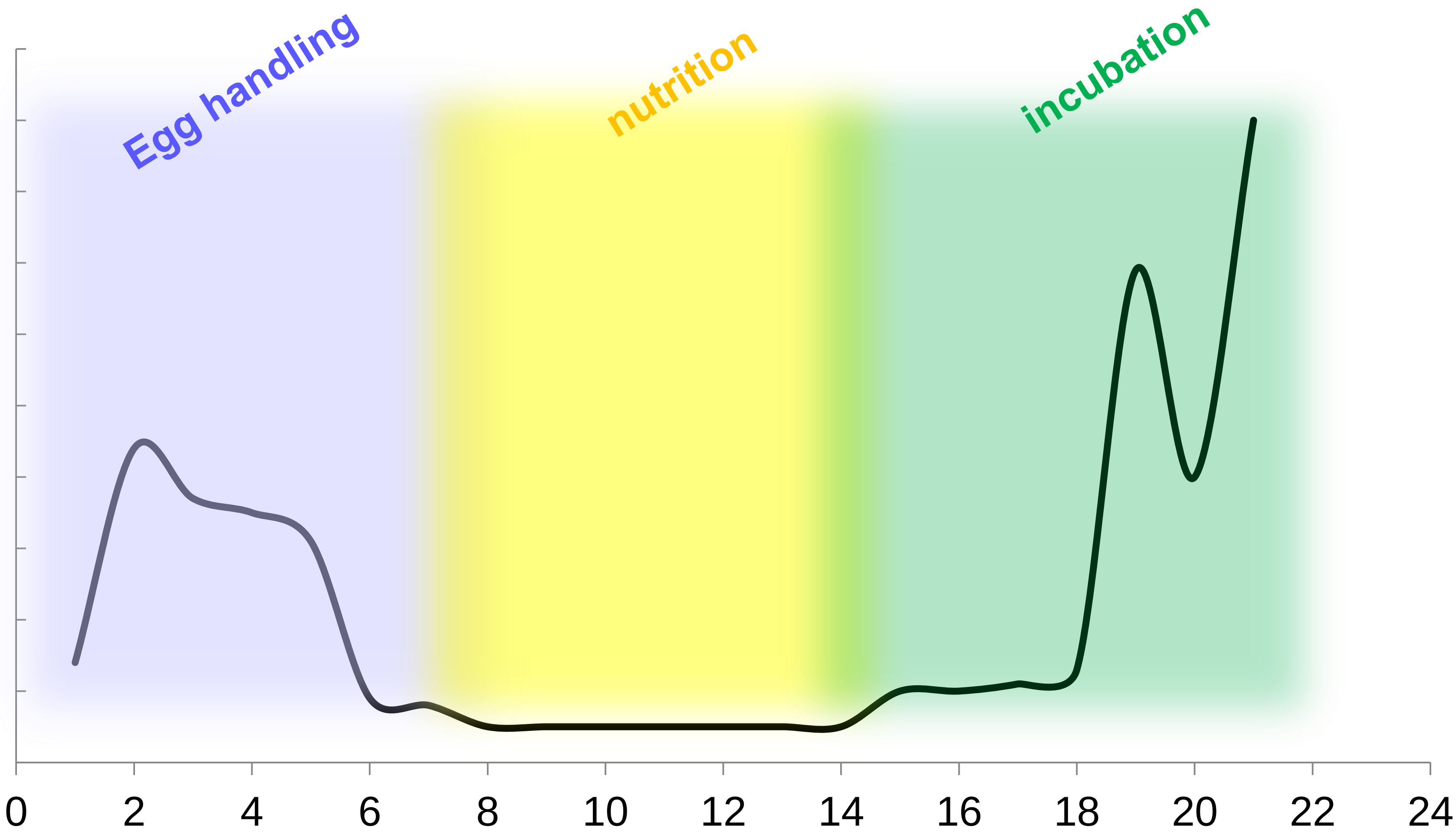
Percent Mortality of Fertile Eggs



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Embryonic Mortality Pattern

- 1-7 days (2 - 4 days)

  - ~ 3.0 %

  - Blood & circulation system developing
- Potential causes

  - Poor egg handling (gathering & storage)

  - Aged flocks (infrequent mating)

  - Incubator problems

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Embryonic Mortality Pattern

- 8 -18 days
  - ~ 0.5%
- Potential causes
  - Incubator problems
  - Breeder nutrition
    - Riboflavin
    - Vitamin B12
    - Manganese
    - Pantothenic acid

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Embryonic Mortality Pattern

- 19-25 days
  - ~ 2.5 %
  - Switch to pulmonary respiration
- Potential causes
  - Increase moisture loss (pull time, low humidity, poor shell quality, etc)
  - Aged flocks
  - Contamination
  - Egg orientation

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Hatchery Residue Breakout

DATE	FLOCK #	BREED ________	AGE
% PRODUCTION	% ACTUAL HATCH	SET DATE	SETTER #

			DEAD EMBRYOS						CRACKS				
	eggs/tray unhatched	infert.	early 1-3 days	early 4-7 days	mid	late	pipped	cull chicks	farm	trans	contaminated	cull eggs	up-side down
TOTALS													
PERCENT													

EGGS / TRAY = 144 eggs * 2 trays = **288 eggs**

Fertility = **100.00**

Hatch of Fertile = **0.00**

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Action Plan

- Accurate egg break-out
  - Hatchery manager & supervisor involvement
- Standard summary
- Analysis of data
- Action plan of correction
- Use information as a management tool

Flock Examination & Record Keeping

- Breakout analysis of a sample of unhatched eggs and record incidences of:
  - Infertiles
  - Dead embryos in one of the 3 stages
  - Pips
  - Cull chicks and cull eggs
  - Farm & transfer cracks
  - Contamination
  - Misplaced eggs (small end up)

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Flock Examination & Record Keeping

- Determine percent weight loss from samples of eggs
  - Weigh eggs prior to incubation
  - Weigh eggs at transfer
  - Calculate weight loss (moisture)
    - Ideal range 0.6 - 0.65 % per day
    - Acceptable 0.55 - 0.7 % per day

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Trouble Shooting Hatchery Problems

- Can the problem be identified with:
  - Specific flocks or flock ages?
  - Specific setters, hatchers or other equipment?
  - Any unusual weather patterns?
  - Seasonal changes?
  - Recent changes in management practices or personnel?

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Trouble Shooting Hatchery Problems

- Does the problem persist?
- Do you know what is *normal,* or what should be expected?
- How has this same bird or combination performed in the past?

Hatch Residue Analysis

- **BREAK OPEN UNHATCHED EGGS!!!!**
- Record results for each hatch.
- Why?   You can't fix poor hatchability if you don't know why they aren't hatching!!!

Strategy

- Learn to use egg break-out data to develop action plans for hatch improvement and monitor results of the action plan.

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Summary

- Obtain appropriate data and keep good records
- Try and identify flocks or equipment as potential problems and/or eliminate areas that are not a factor

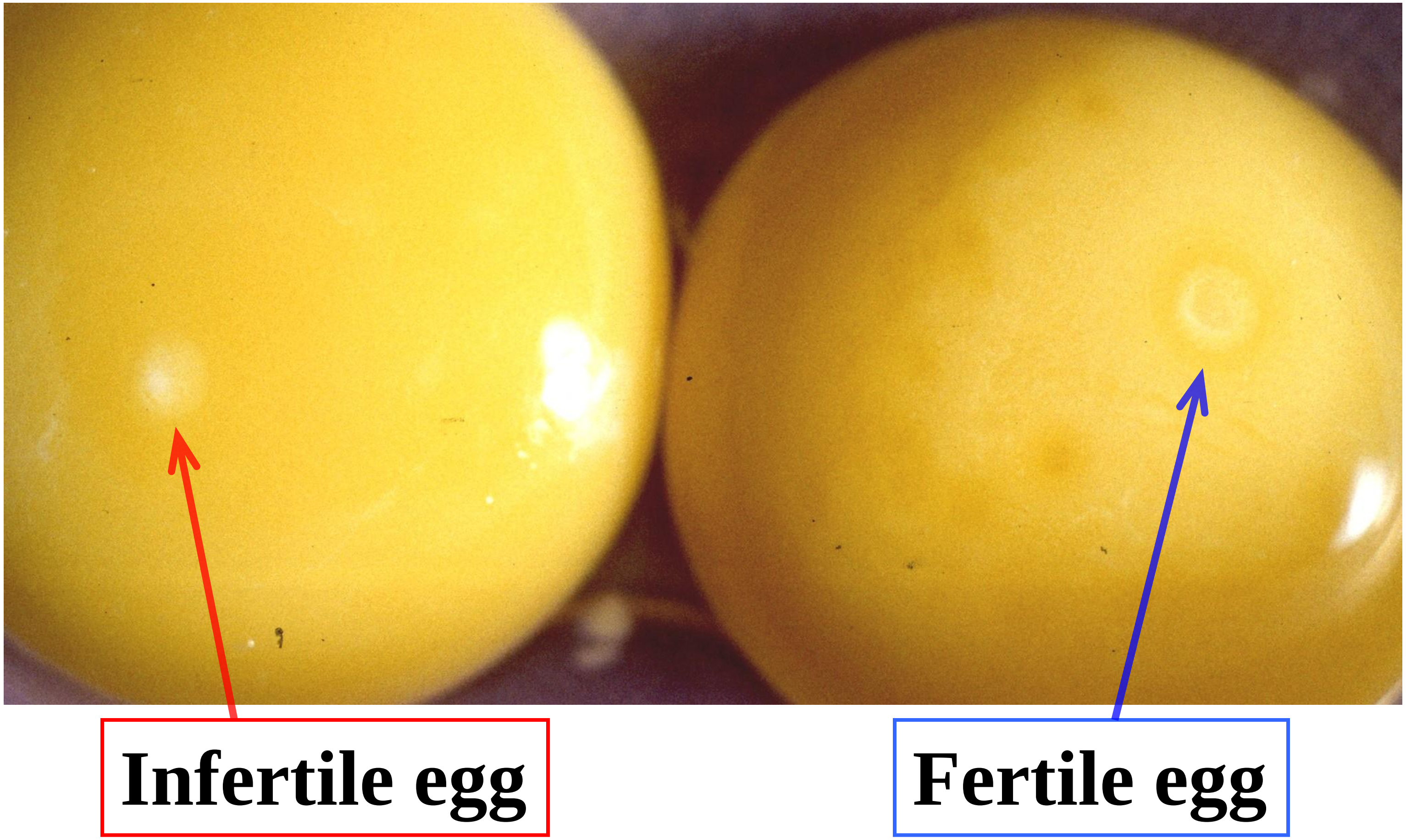
Summary

- Try and determine if any other changes have occurred that may affect the problem
- Make necessary adjustments where needed

Fertile vs. Infertile

- Do not classify abnormal conditions as fertile
  - Blood spots (not blood ring remnants)
  - Meat spots
  - Mottled yolks
  - Contamination (esp. Yeast)
  - Chalaza

Fertile and Infertile Eggs



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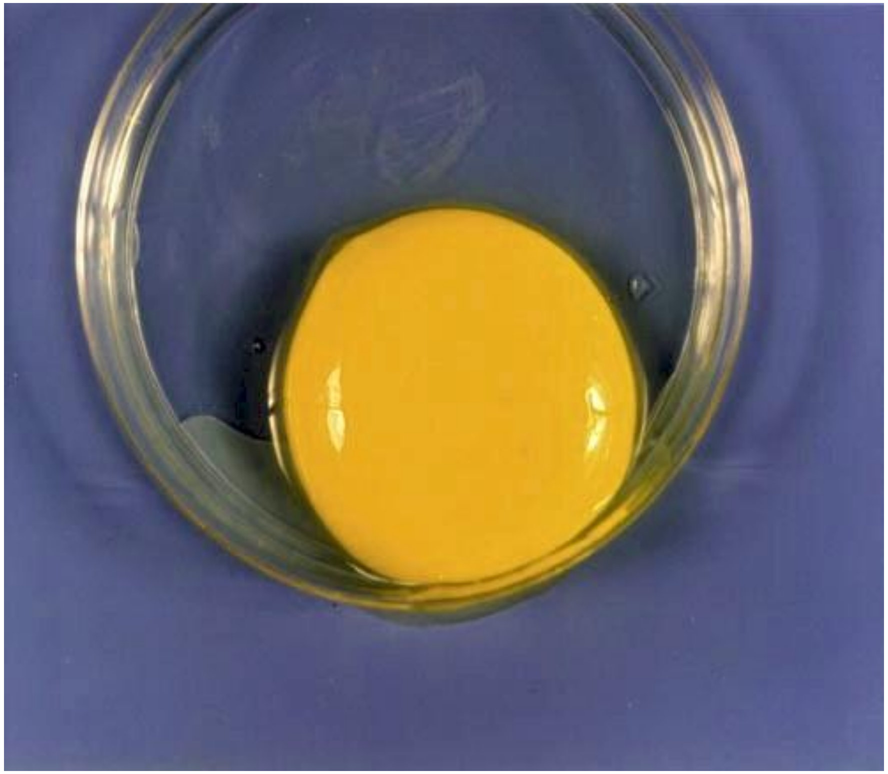
Infertile

Embryonic Development

- No development



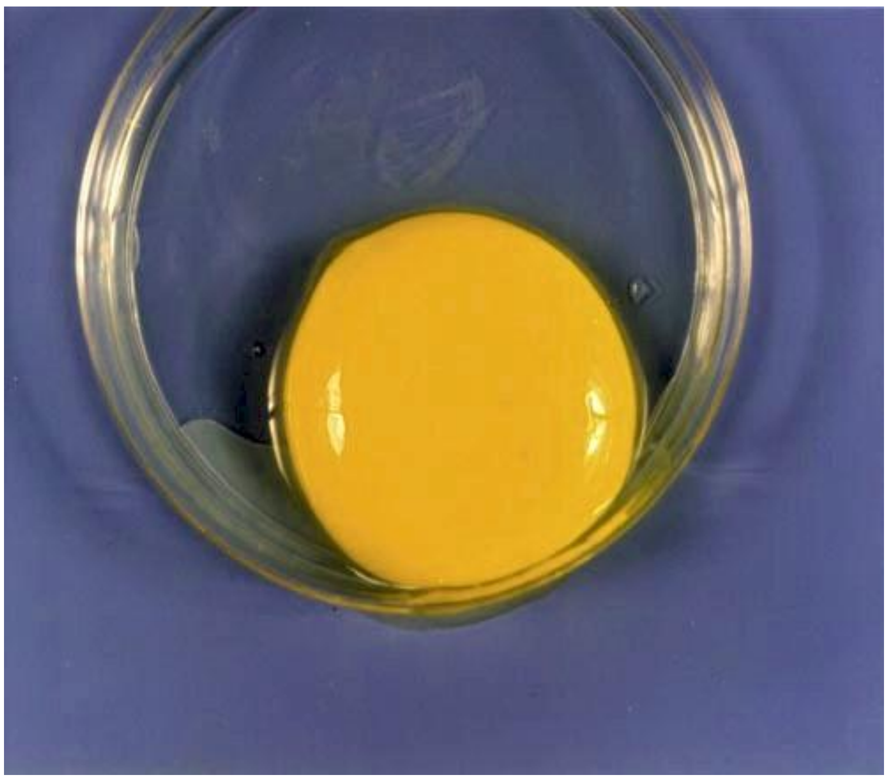
Troubleshooting Guide

- Immature males – need stimulation 2 weeks before hens
- Too few males, infrequent mating
- Too many males, infrequent mating
- Extreme weather conditions
- Old breeders
- Breeder flock disease
- Excess body weight
  - males and females
- Feet and leg problems
  - Males, heavy breeds

Infertile

Embryonic Development

- No development



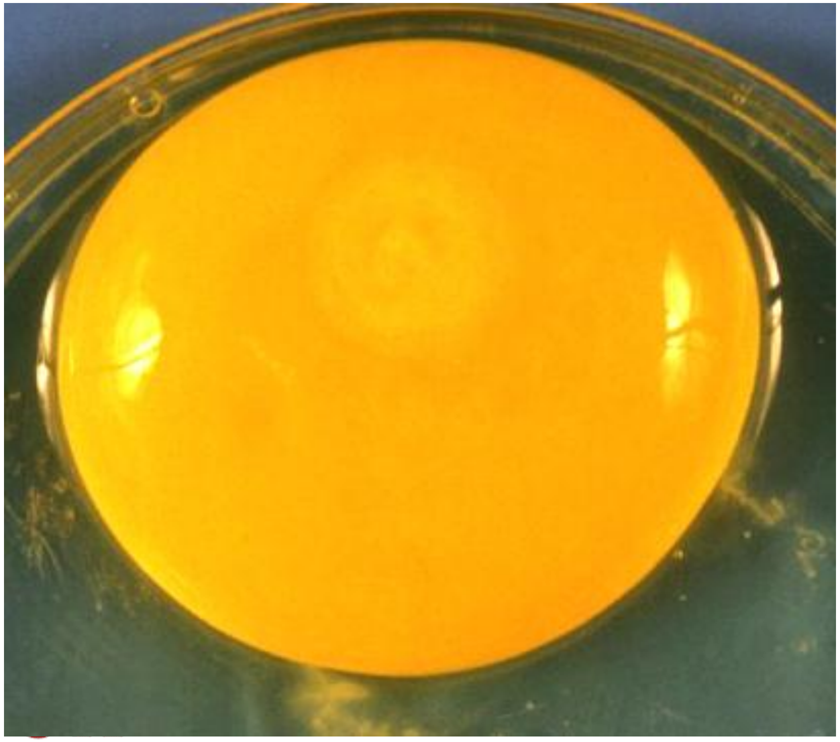
Troubleshooting Guide

- Males and hens with abnormal sperm or egg
  - Both occur in young or old
- Nutritional deficiencies, excesses
  - Severe feed restriction
- Certain drugs, pesticides, chemicals, toxins, mycotoxins
- Parasites, such as mites
- Inadequate floor space
- Inadequate lighting (intensity or length)
- DECREASED MATING FREQUENCY

Day 1

Embryonic Development

- Appearance of tissue development



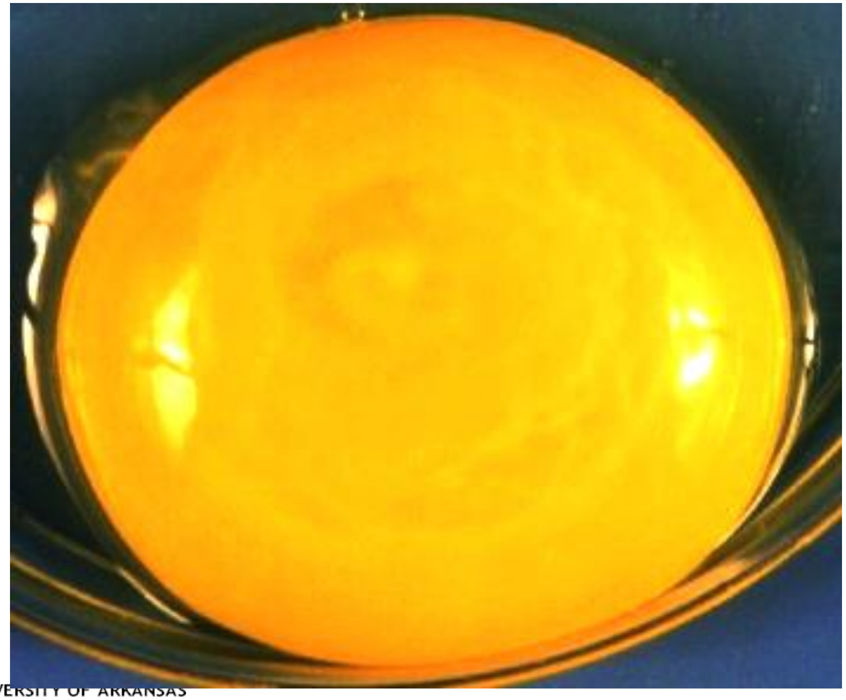
Troubleshooting Guide

- Low fertility
- Pre-incubation, poor egg storage
- Rough egg handling
- Improper egg holding time
- Rough setting of eggs
- Contaminated eggs
- Nutritional- drugs-toxins

Day 2

Embryonic Development

- Tissue development very visible
- Appearance of blood vessels



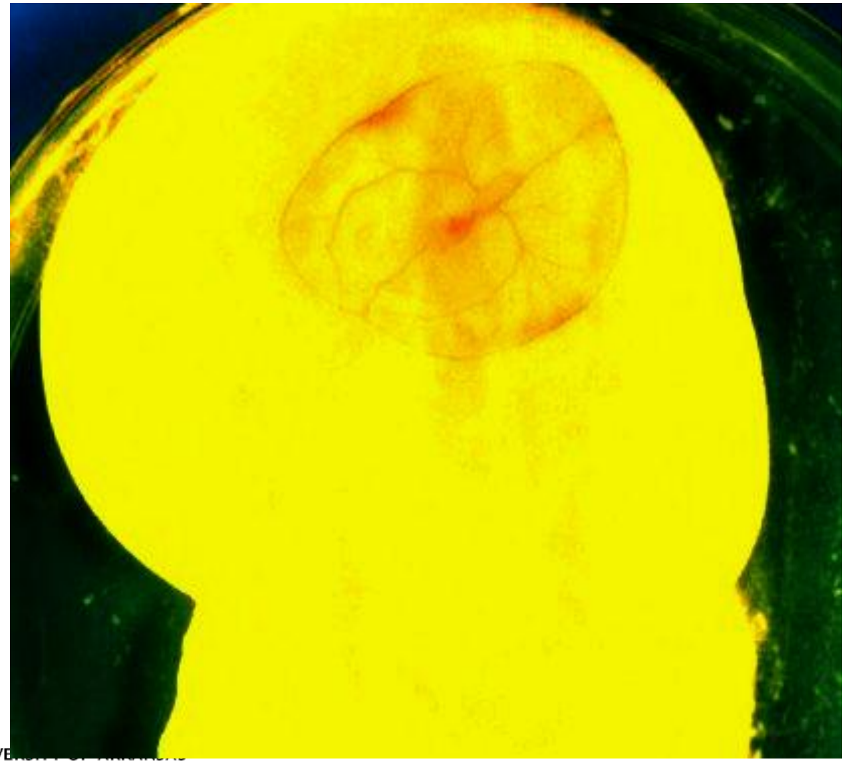
Troubleshooting Guide

- Low fertility
- Pre-incubation, poor egg storage
- Rough egg handling
- Improper egg holding time
- Rough setting of eggs
- Contaminated eggs
- Nutritional- drugs-toxins

Day 3

Embryonic Development

- Heart beats
- Blood vessels very visible



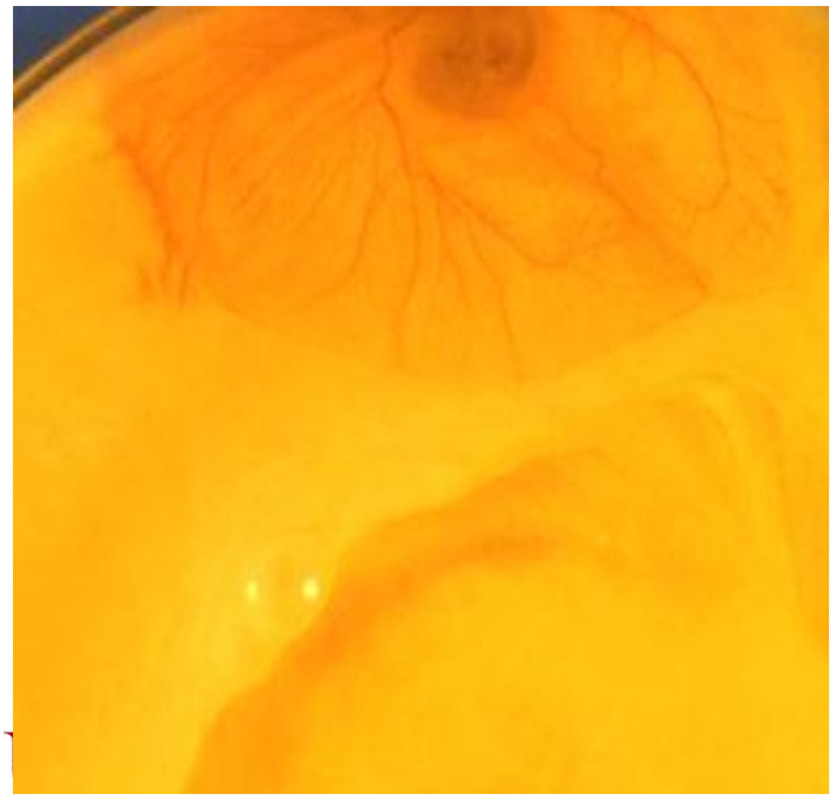
Troubleshooting Guide

- Low fertility
- Pre-incubation, poor egg storage
- Improper egg holding time
- Rough setting of eggs
- Contaminated eggs
- Nutritional- drugs-toxins

Day 4

Embryonic Development

- Eye pigmented



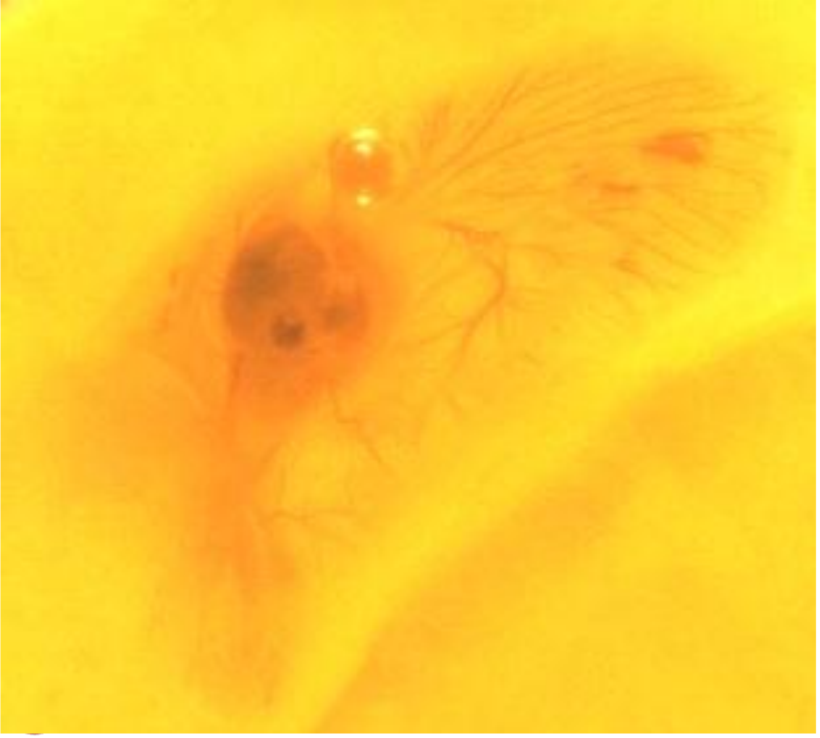
Troubleshooting Guide

- Improper turning
- Improper temperature
- Improper ventilation
- Inverted eggs
- Rough setting of eggs
- Contaminated eggs
- Nutritional
  - Vitamin E, riboflavin, biotin, pantothenic acid, linoleic acid
- Drugs-toxins

Day 5

Embryonic Development

- Appearance of elbows and knees



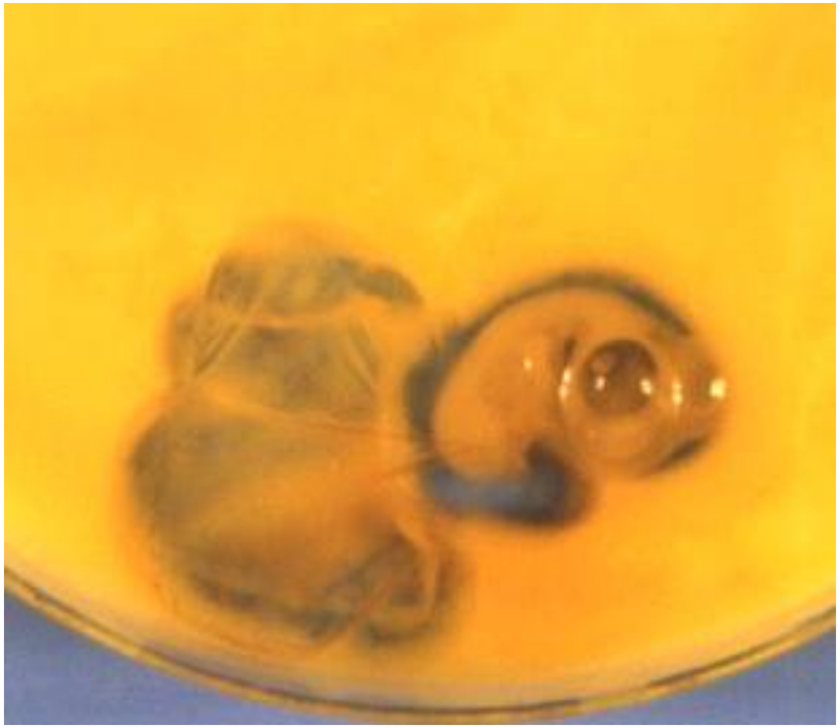
Troubleshooting Guide

- Improper turning
- Improper temperature
- Improper ventilation
- Inverted eggs
- Rough setting of eggs
- Contaminated eggs
- Nutritional
  - Vitamin E, riboflavin, biotin, pantothenic acid, linoleic acid
- Drugs-toxins

Day 6

Embryonic Development

- Appearance of beak
- Voluntary movement begins



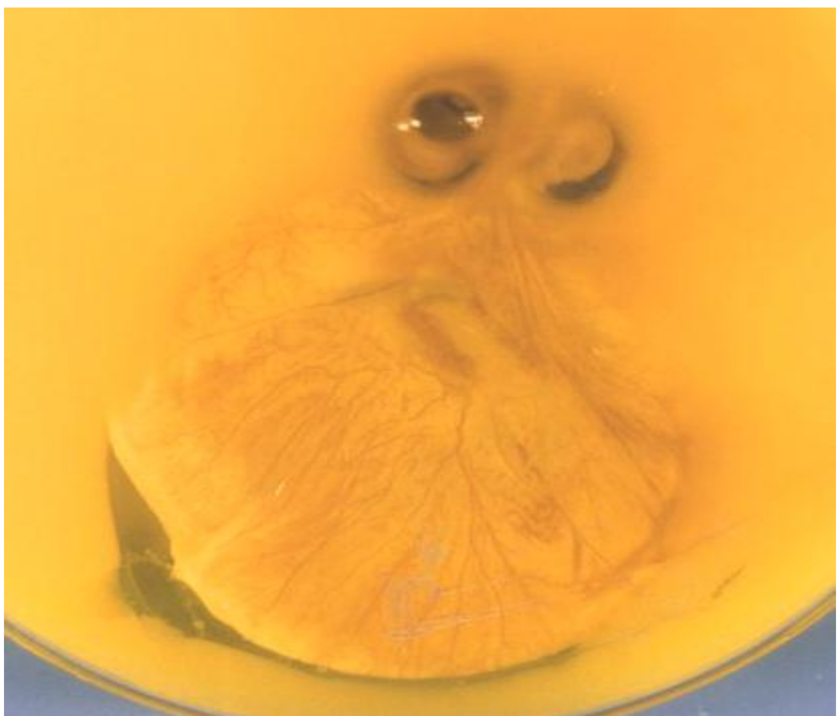
Troubleshooting Guide

- Improper turning
- Improper temperature
- Improper ventilation
- Inverted eggs
- Rough setting of eggs
- Contaminated eggs
- Nutritional
  - Vitamin E, riboflavin, biotin, pantothenic acid, linoleic acid
- Drugs-toxins

Day 7

Embryonic Development

- Comb growth begins
- Egg tooth begins to appear



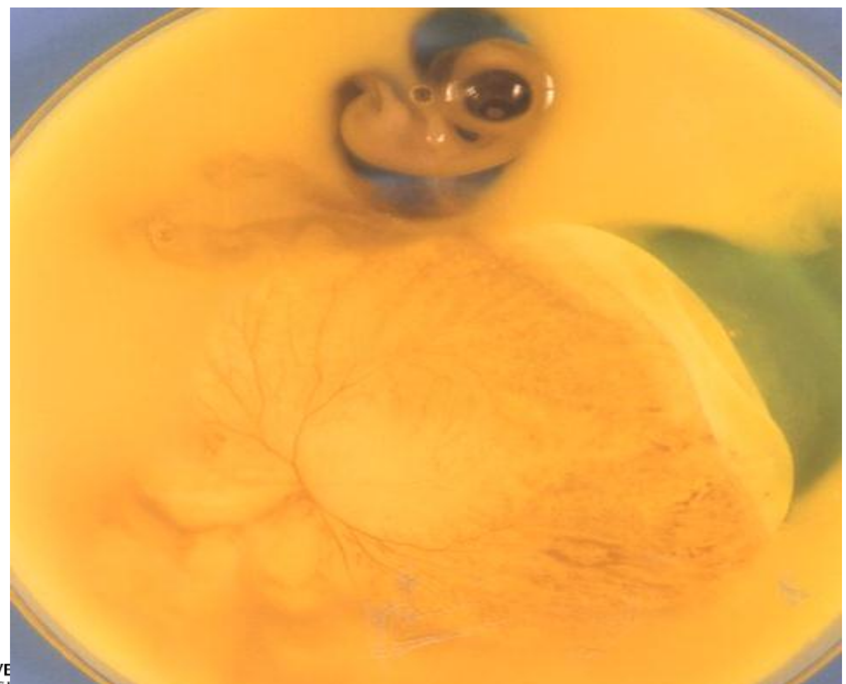
Troubleshooting Guide

- Improper turning
- Improper temperature
- Improper ventilation
- Inverted eggs
- Rough setting of eggs
- Contaminated eggs
- Nutritional
  - Vitamin E, riboflavin, biotin, pantothenic acid, linoleic acid
- Drugs-toxins

Day 8

Embryonic Development

- Feather tracts seen
- Upper and lower beak equal in length



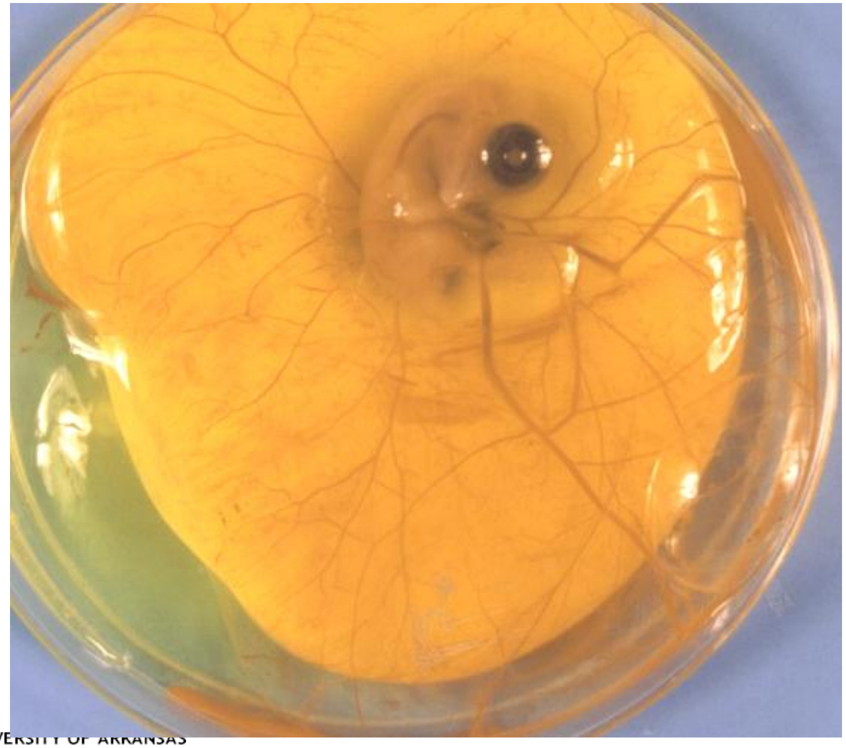
Troubleshooting Guide

- Improper turning
- Improper temperature
- Improper humidity
- Improper ventilation
- Inverted eggs
- Insufficient egg holding time
- Rough setting of eggs
- Contaminated
- Nutritional
  - Riboflavin, vitamin B12, biotin, niacin, pyridoxine, pantothenic acid, phosphorous, boron, linoleic acid

Day 9

Embryonic Development

- Embryo starts to look bird like
- Mouth opening appears



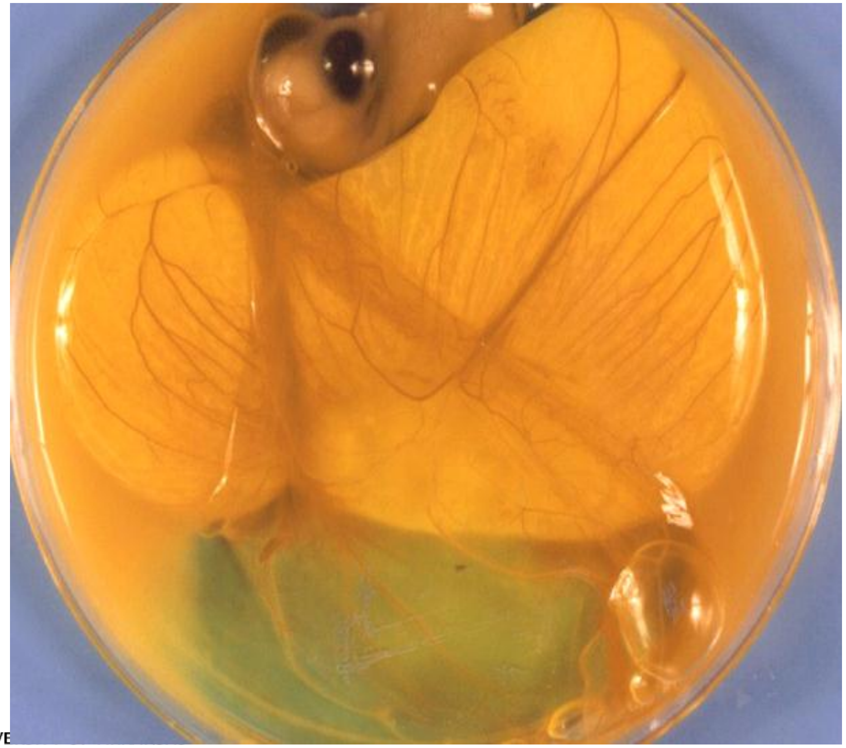
Troubleshooting Guide

- Improper turning
- Improper temperature
- Improper humidity
- Improper ventilation
- Inverted eggs
- Insufficient egg holding time
- Rough setting of eggs
- Contaminated
- Nutritional
  - Riboflavin, vitamin B12, biotin, niacin, pyridoxine, pantothenic acid, phosphorous, boron, linoleic acid

Day 10

Embryonic Development

- Egg tooth prominent
- Toe nails



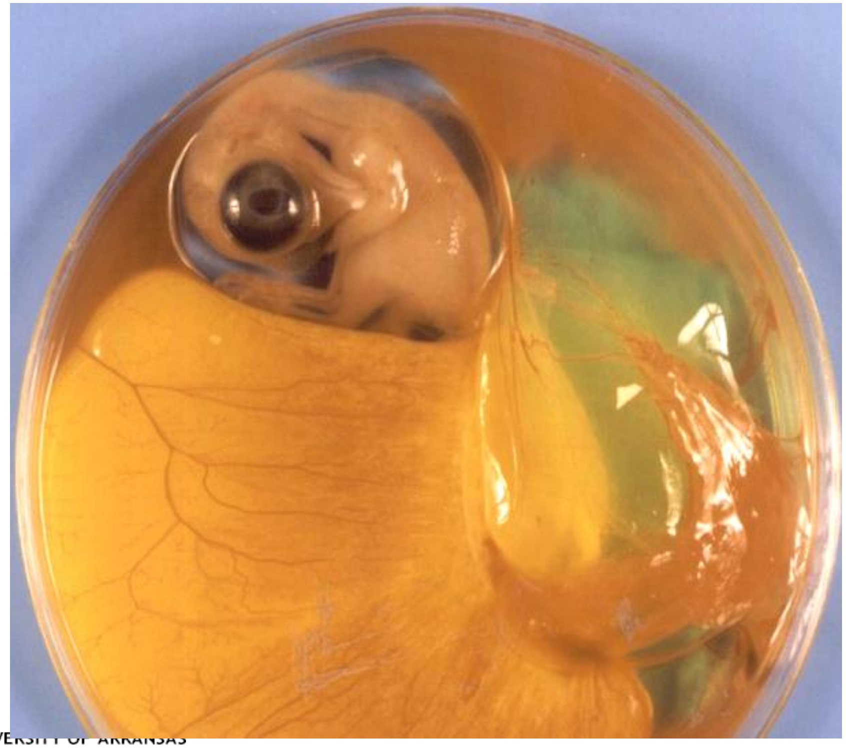
Troubleshooting Guide

- Improper turning
- Improper temperature
- Improper humidity
- Improper ventilation
- Inverted eggs
- Insufficient egg holding time
- Rough setting of eggs
- Contaminated
- Nutritional
  - Riboflavin, vitamin B12, biotin, niacin, pyridoxine, pantothenic acid, phosphorous, boron, linoleic acid

Day 11

Embryonic Development

- Comb serrated
- Tail feathers apparent



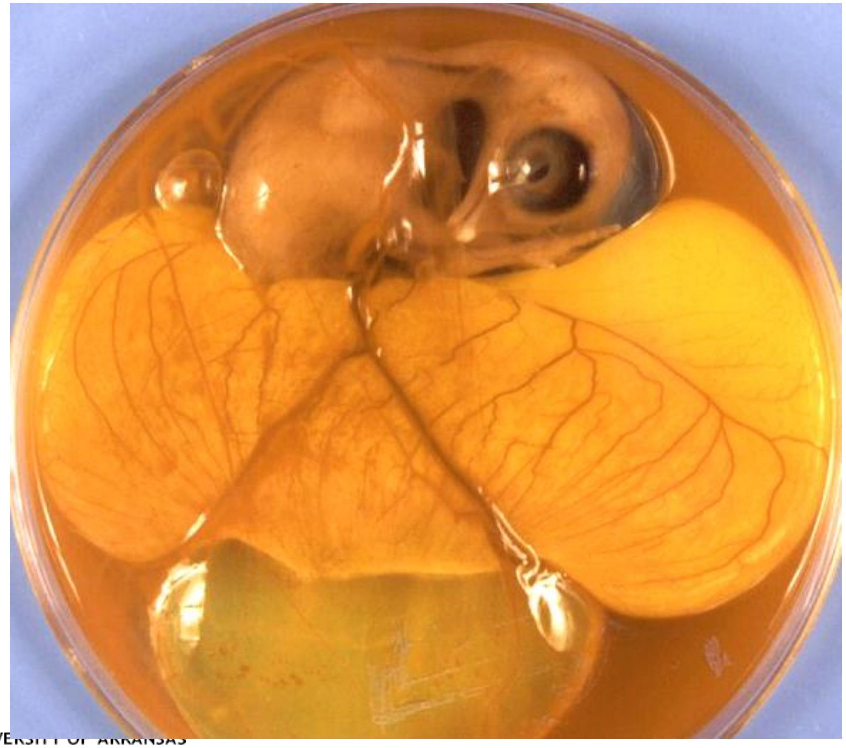
Troubleshooting Guide

- Improper turning
- Improper temperature
- Improper humidity
- Improper ventilation
- Inverted eggs
- Insufficient egg holding time
- Rough setting of eggs
- Contaminated
- Nutritional
  - Riboflavin, vitamin B12, biotin, niacin, pyridoxine, pantothenic acid, phosphorous, boron, linoleic acid

Day 12

Embryonic Development

- Toes fully formed
- First few visible feathers



Troubleshooting Guide

- Improper turning
- Improper temperature
- Improper humidity
- Improper ventilation
- Inverted eggs
- Insufficient egg holding time
- Rough setting of eggs
- Contaminated
- Nutritional
  - Riboflavin, vitamin B12, biotin, niacin, pyridoxine, pantothenic acid, phosphorous, boron, linoleic acid

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Day 13

Embryonic Development

- Appearance of scales
- Body covered lightly with feathers

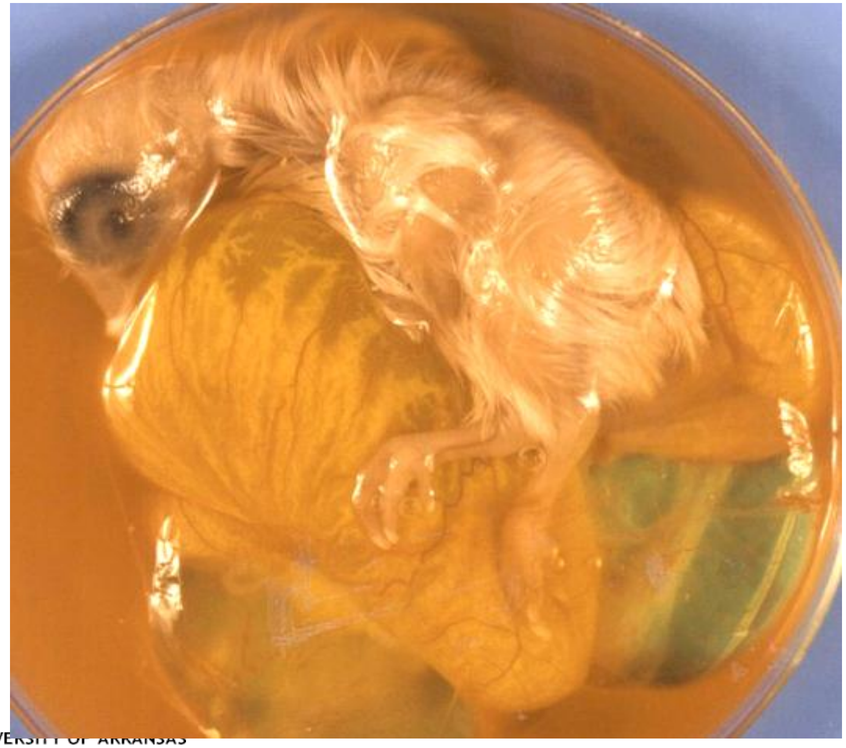
Troubleshooting Guide

- Improper turning
- Improper temperature
- Improper humidity
- Improper ventilation
- Inverted eggs
- Insufficient egg holding time
- Rough setting of eggs
- Contaminated
- Nutritional
  - Riboflavin, vitamin B12, biotin, niacin, pyridoxine, pantothenic acid, phosphorous, boron, linoleic acid

Day 14

Embryonic Development

- Embryo turns head towards large end of egg



Troubleshooting Guide

- Improper turning
- Improper temperature
- Improper humidity
- Improper ventilation
- Inverted eggs
- Insufficient egg holding time
- Rough setting of eggs
- Contaminated
- Nutritional
  - Riboflavin, vitamin B12, biotin, niacin, pyridoxine, pantothenic acid, phosphorous, boron, linoleic acid

Day 15

Embryonic Development

- Gut is drawn into abdominal cavity

Troubleshooting Guide

- Improper turning
- Improper temperature
- Improper humidity
- Improper ventilation
- Inverted eggs
- Contaminated
- Nutritional
  - Riboflavin, vitamin B12, biotin, niacin, pyridoxine, pantothenic acid, phosphorous, boron, linoleic acid

Day 16

Embryonic Development

- Feathers cover complete body
- Albumen nearly gone

Troubleshooting Guide

- Improper turning
- Improper temperature
- Improper humidity
- Improper ventilation
- Inverted eggs
- Contaminated
- Nutritional
  - Riboflavin, vitamin B12, biotin, niacin, pyridoxine, pantothenic acid, phosphorous, boron, linoleic acid

Day 17

Embryonic Development

- Amniotic fluid decreases
- Head is between legs

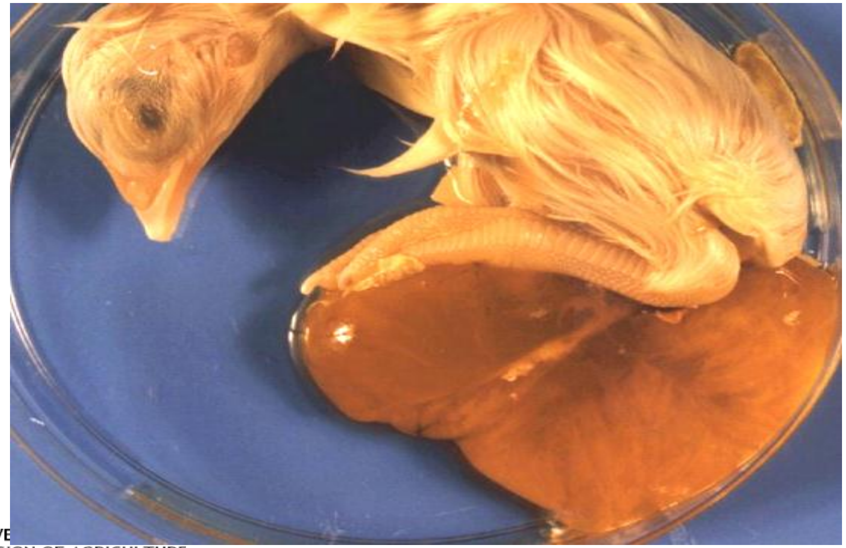
Troubleshooting Guide

- Improper turning
- Improper temperature
- Improper humidity
- Improper ventilation
- Inverted eggs
- Contaminated
- Nutritional
  - Riboflavin, vitamin B12, biotin, niacin, pyridoxine, pantothenic acid, phosphorous, boron, linoleic acid

Day 18

Embryonic Development

- Growth of embryo nearly complete
- Yolk sac is still on outside of embryo
- Head is under the right wing



Troubleshooting Guide

- Hatcher opened too much during hatch cycle
- Rough transfer
  - Transfer cracks, delays
- Wet trays and hatchers
- Inconsistent transfer
- Improper turning
- Improper temperature
- Improper humidity
- Improper ventilation
- Inverted eggs
- Contaminated – molds, etc
- Nutritional

Day 19

Embryonic Development

- Yolk sac draws into body cavity
- Amniotic fluid gone
- Embryo occupies most of space within egg(not in the air cell)

Troubleshooting Guide

- Hatcher opened too much during hatch cycle
- Rough transfer
  - Transfer cracks
- Wet trays and hatchers
- Inconsistent transfer
- Improper turning
- Improper temperature
- Improper humidity
- Improper ventilation
- Inverted eggs
- Contaminated, molds etc
- Nutritional

Day 20

Embryonic Development

- Yolk sac drawn completely into body
- Embryo becomes a chick(breathing in air cell)
- Internal & external pip

Troubleshooting Guide

- Hatcher opened too much during hatch cycle
- Rough transfer
  - Transfer cracks
- Wet trays and hatchers
- Inconsistent transfer
- Improper turning
- Improper temperature
- Improper humidity
- Improper ventilation
- Inverted eggs
- Contaminated, molds etc
- Nutritional

Day 20

Embryonic Development

- Yolk sac drawn completely into body
- Embryo becomes a chick(breathing in air cell)
- Internal & external pip

Troubleshooting Guide

- Nutritional deficiencies
  - Vitamin D, vitamin A, folic acid, pantothenic acid, riboflavin, vitamin E, selenium, vitamin K, biotin, thiamin, vitamin B12, calcium, phosphorous, manganese, linoleic acid
- Breeder disease
- Poor shell quality

Pipped

- Signs
  - Dead in shell
  - Full-term embryo
- Causes
  - **Low humidity or temperature for long periods**
  - **Hatcher humidity low**
  - **High temperatures during hatching**
  - Nutritional deficiencies
  - Breeder disease
  - Poor ventilation
  - Inadequate turning (day 1-12)
  - Injury during transfer
  - Prolonged egg storage

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Not Pipped

- Signs
  - Dead in shell
  - Full term embryo
  - Large yolk sac
  - Yolk sac may not be fully engulfed by abdominal wall
  - May have residual albumen

- Causes
  - **Inadequate turning**
  - **Humidity high**
  - **Setter temperature low**
  - Eggs chilled (transfer)
  - Nutritional deficiencies
  - Genetics
  - Embryo accidental development
  - Breeder disease
  - Poor ventilation
  - Prolonged egg storage

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Partially Pipped

- Signs
  - Embryo alive
  - Embryo dead
- Causes
  - Same as for pipped, full-term embryos
  - Excessive fumigation during hatching
  - Egg set small end up

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Malpositioned Chicks

- Signs
  - Normal position after 19 days
  - Embryo long axis same as egg long axis
  - Head in large end of egg
  - Head to the right and under right wing
  - Beak towards air cell
  - Feet towards head

- Causes
  - Eggs set small end up
  - Improper egg turning
  - Setter temperature too high or too low
  - Humidity too high
  - Old breeders
  - Round shaped eggs or very large eggs
  - Nutritional deficiencies
    - Vit A and vit B_{12}
  - Poor egg handling or storage
  - Retarded development

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Chicks Hatching Early

- Signs
  - Excessively noisy chicks
  - Thin chicks
  - Dry skin around legs and feet
  - Increased 7 day field mortality
- Causes
  - Small eggs
  - Breed differences
  - Setter temperature too high
  - Setter humidity too low

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Chicks Hatching Late

- Signs
  - Called 'green chicks'
  - Swollen abdomen
- Causes
  - Large eggs
  - Old breeders
  - Eggs stored too long
  - Setter temperature too low
  - Weak embryos
  - Inbreeding (genetics)
  - Setter humidity too high

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Slow Hatch

- Signs
  - Protracted or 'drawn-out' hatch
  - Mixture of early and late hatched chicks
  - Chicks begin hatching early but slow to finish
- Causes
  - Mixture of eggs stored too long and too short
  - Mixture of eggs from young and old breeders
  - Mix of large and small eggs
  - Improper egg handling
  - Hot or cold spots in setters or hatchers
  - High or low temperatures in setters or hatchers
  - Poor ventilation in machines and rooms & hallways

Poor Chick Quality

- Signs
  - Hatching trays not hatching uniformly throughout machine
- Causes
  - Mix of large and small eggs
  - Mix of eggs from young and old breeders
  - Mix of eggs from different strains (breeds)
  - Variation in egg storage
  - Setter or hatcher ventilation not uniform
  - **Disease or stress in <u>some</u> breeder flocks**
  - Variation in on farm egg storage procedures

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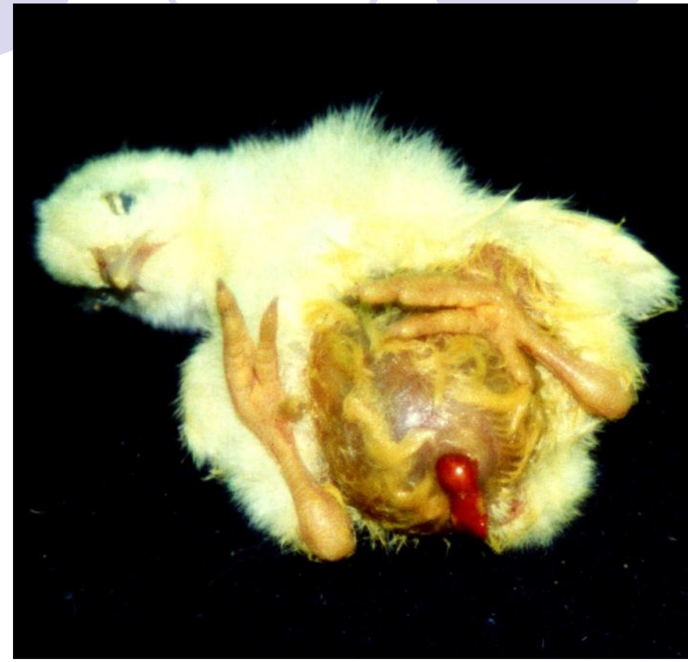
Open or Unhealed Navel



- Signs
  - Open and unhealed navels
  - Dry, rough down feathers
- Causes
  - Setter temperature too high or variation in temperature
  - Hatcher temperature low
  - Hatcher humidity too high, or not lowered at hatch completion
  - Poor breeder nutrition

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Stringy Navel

- Signs
  - Dry, rough down
  - Unhealed navel
  - ‘string’ attached to navel
- Causes
  - Setter temperature too high or too low
    - Wide fluctuations in temperature
- Hatcher humidity too high
- Inadequate breeder nutrition

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Unhealed Navel, Infection

- Signs
  - Wet, odorous chicks
  - Large, mushy
  - Soft bodied, lethargic
- Causes
  - Omphalitis, navel infection and contamination
    - Egg contamination from breeder farm, egg transport, hatchery
    - Unsanitary trays, machines, etc
  - Setter temperature too low
  - Setter or hatcher humidity too high
  - Poor ventilation

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Red Hocks

- Signs
  - Red hocks
    - hatched chicks
    - unhatched chicks
  - Red abrasion on upper beak
- Causes
  - Difficulty during hatching and pipping
    - Thick shells (pullet flocks)
    - High setter humidity
    - Low setter temperature
  - Vitamin deficiency

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Chicks Stuck in Shell

- Signs
  - Some chicks stuck in shell
  - Chicks dry
  - Shell fragments stuck to down
- Causes
  - Humidity too low during egg storage, incubation, and/or hatching
  - Improper egg turning
  - Cracked eggs or poor shell quality

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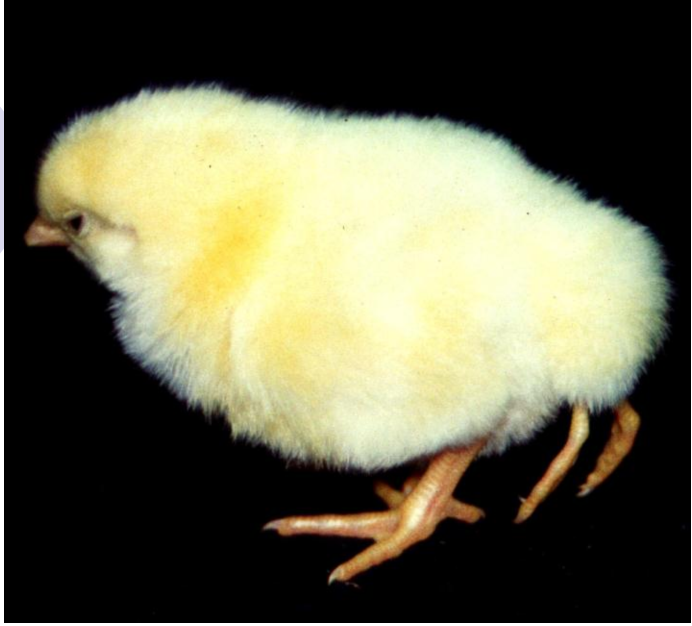
Skeletal Malformations



- Signs
  - Posterior duplication
  - Any multiple truncated development
- Causes
  - Poor egg storage and handling
  - Genetics
  - Nutritional deficiencies
    - Examples: biotin, riboflavin, zinc, manganese
  - Inadequate turning
  - Improper egg orientation (small end up)
  - Setter temperature too high or too low
  - Breeder disease
  - Poor venitilation or poor conductivity of eggs

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Brain Hernia (Exposed Brain)

- Temperature too high
- Egg turning problems
- High CO_2 level

- Equipment malfunction

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Cross Beak & Missing Eye

- Temperature too high
- Egg turning problems

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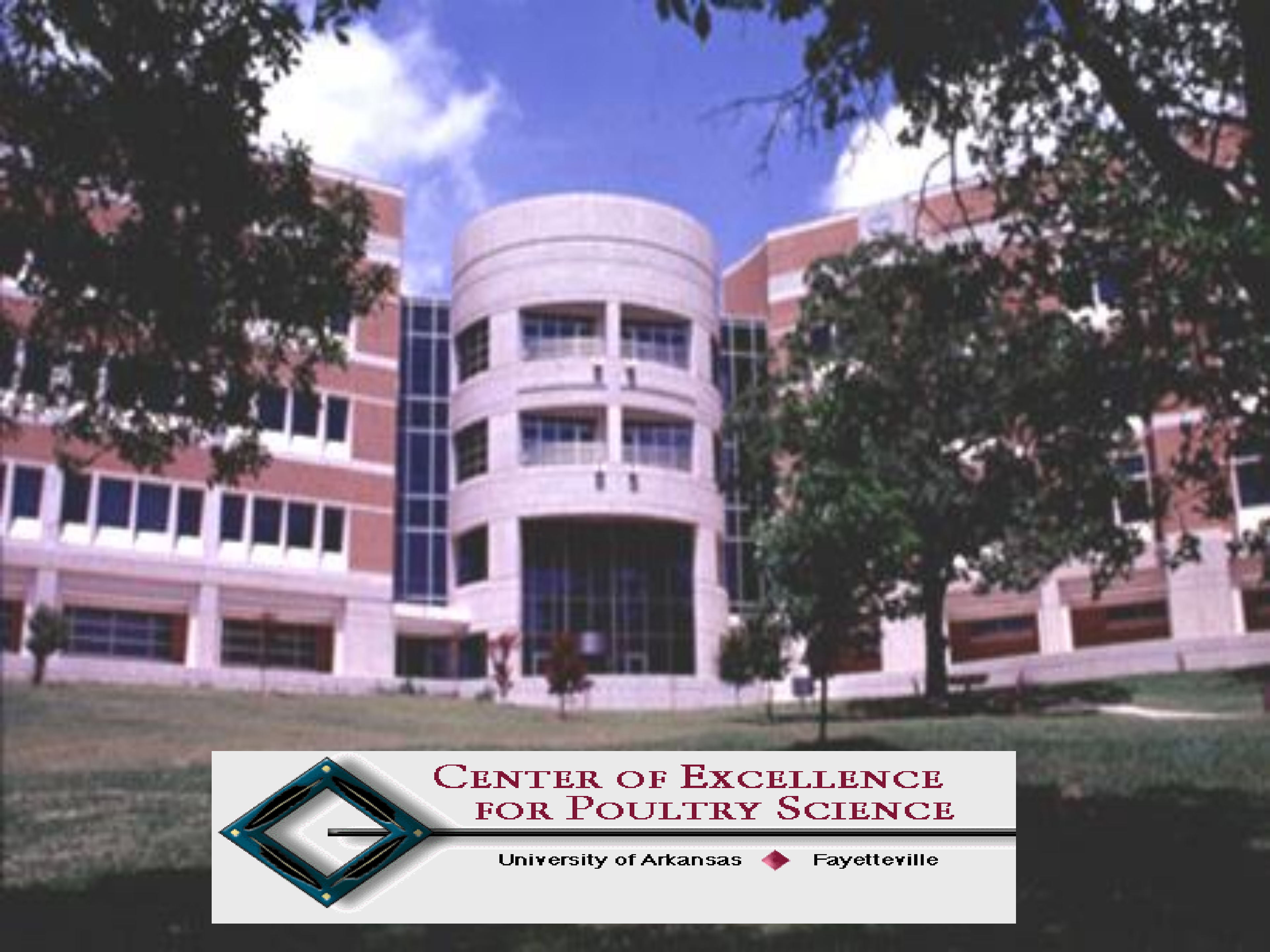
Center of Excellence
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University of Arkansas
Fayetteville

HAEMOPROTEUS IN CAPTIVE-BRED BOBWHITE QUAIL IN SOUTHERN UTAH

E. Jane Kelly, DVM, MS

A captive-bred bobwhite quail ranch in southern Utah experienced high mortality rates in the late summer and fall of 2012. Death was attributed to infection with *Haemoproteus* spp., a protozoan blood parasite. *Haemoproteus* spp. are transmitted by arthropods and infect mammals, reptiles, and amphibians as well as a wide variety of birds. The traditional view has been that infections are largely non-pathogenic but, more recently, severe infections have been reported in some bird populations including captive-bred bobwhite quail in California. The identification of this parasite in quail in southern Utah implies that appropriate vectors are present in the state and that there is potential risk to other birds such as zoo and aviary populations, wild turkeys, and other game birds.

TYPICAL GAME BIRD HEALTH ABNORMALITIES ENOUNTERED IN THE INTERMOUNTAIN WEST

Utah Game Bird Health and Management Symposium
Green River, Utah
March 8, 2013

David D. Frame, DVM, DACPV
Extension Poultry Specialist
Utah State University

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Classes of Disease

Bacterial

Fungal

Protozoal

Parasites

Nutritional

Toxic

Viral

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Bacterial

***Salmonella* spp.(paratyphoid infection, salmonellosis)**
***E. coli* (colibacillosis, colisepticemia)**

Typically affect young chicks – 0 to 3 weeks old:

- Listlessness, seek heat.
- +/- pasty vent, other signs of intestinal disturbance.
- Origin can be either hatchery or brooder environment.

Bacterial

***Salmonella* spp.(paratyphoid infection, salmonellosis)**
***E. coli* (colibacillosis, colisepticemia)**

Treatment:

- Resistant to many antibiotics.
- Antibiotic sensitivity recommended.
- Supportive practices (TLC): monitor heat, make sure feed and water is readily available.

Bacterial

***Salmonella* spp.(paratyphoid infection, salmonellosis)**
***E. coli* (colibacillosis, colisepticemia)**

Prevention:

- Adult intestinal carriers (*Salmonella*) – don't use for breeders.
- Optimal egg and hatchery sanitation critical.
- Don't mix birds of different species or ages.
- Rodent control – extremely important for *Salmonella* control in brooder!!

Bacterial

Pasteurella multocida (fowl cholera, pasteurellosis)

Typically a disease of the growout/flight pens – >6 weeks old:

- Listlessness, fever, red or bluish skin, mucous
- +/- diarhea (yellow or greenish)
- Origin = cats, rodents, wild birds; picking at dead birds (increases spread).

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Bacterial

Pasteurella multocida (fowl cholera, pasteurellosis)

Treatment:

- Antibiotic sensitivity recommended.
- Sulfas, penicillin are usually drugs of choice.
- Warning: administering sulfas to laying hens may adversely affect egg production.

Bacterial

Pasteurella multocida **(fowl cholera, pasteurellosis)**

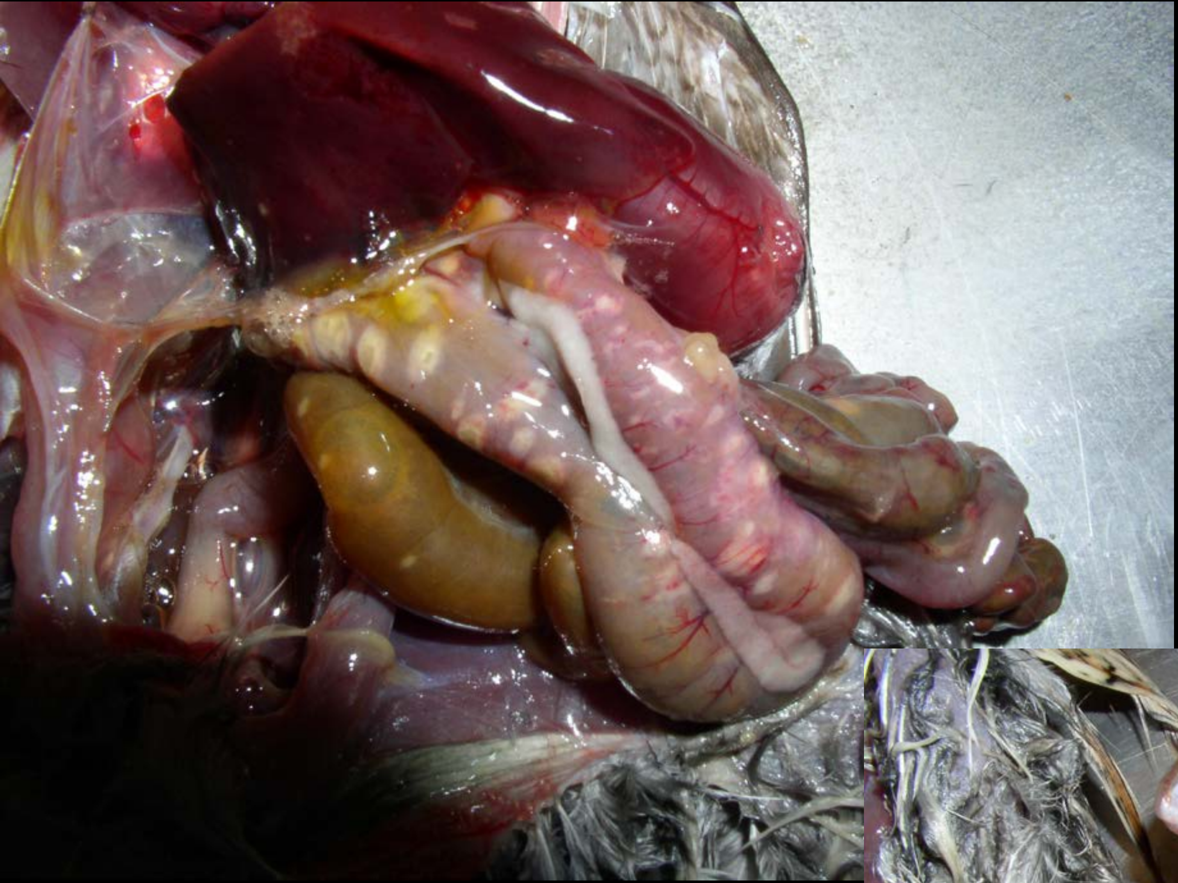
Prevention:

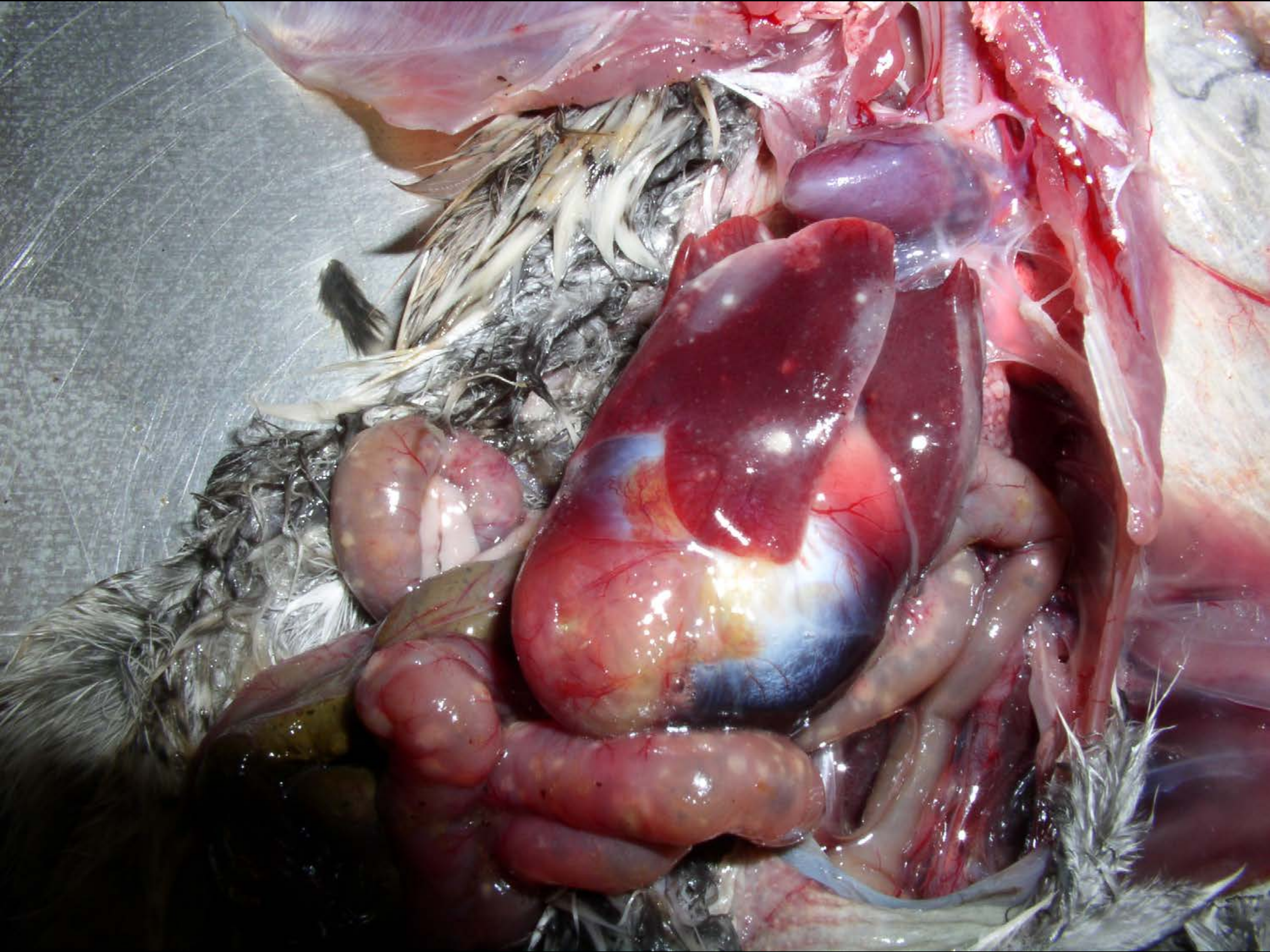
- Rodent/varmint control in pens!!
- Frequently pick up dead birds and properly dispose.
- Don't mix birds of different ages. Be especially careful not to introduce older birds that come from a flock in which fowl cholera is/was present.
- Killed vaccines are available for short term use.

Bacterial

Clostridium colinum (ulcerative enteritis)

- Quail, pheasants, turkeys, [chickens]
- Young are more susceptible than mature.
- Ulcers in gut; spotted/speckled livers.



Bacterial

***Clostridium colinum* (ulcerative enteritis)**

Treatment:

- Penicillin, bacitracin, neomycin, lincomycin, tetracyclines.
- Tends to develop resistance to medication on farms where it recurs.
- Remove litter and put in new while on medication.

Bacterial

Clostridium colinum (ulcerative enteritis)

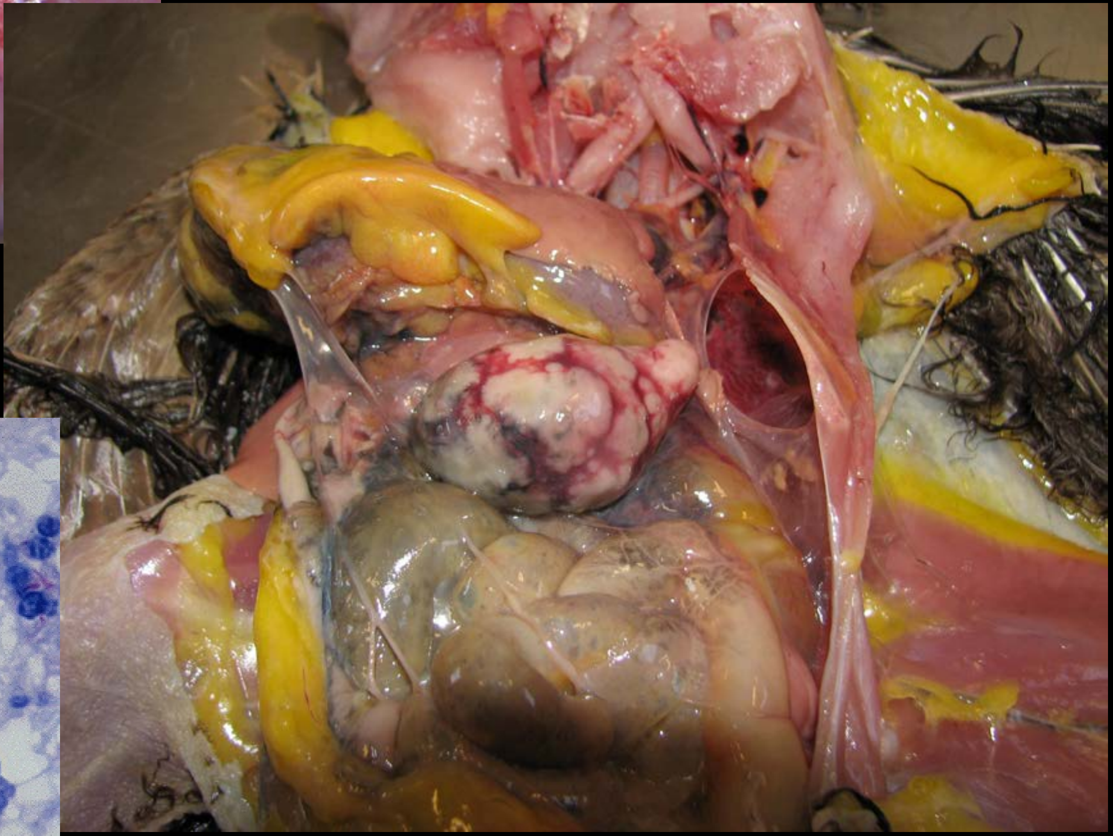
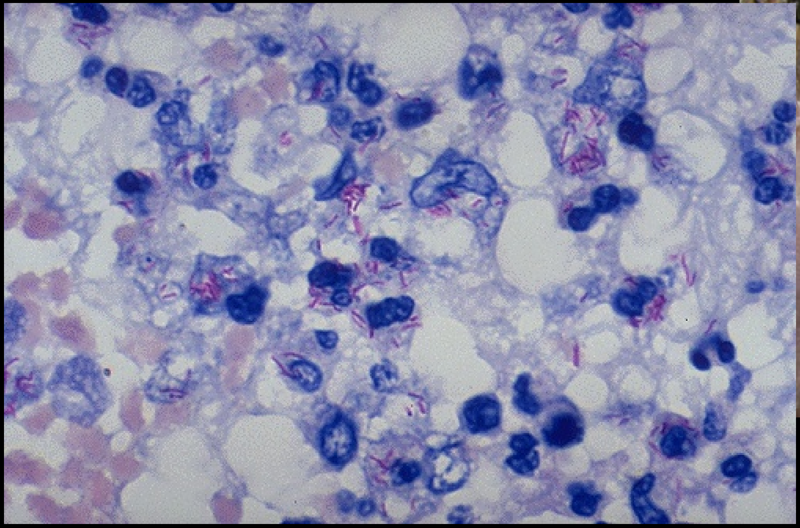
Prevention:

- Minimize stressful procedures – moving, servicing, etc.
- Separate by age and species.
- Especially with quail, may need to consider raising on wire.

Bacterial

Mycobacterium avium (avian tuberculosis)

- Contagious, chronic infection; can infect all species of birds.
- Appears in birds > 2 years of age.
- Fecal excretion →Persists in soil.
- Loss of weight + lameness

Bacterial

Mycobacterium avium (avian tuberculosis)

Treatment:

- NONE!!
- Depopulation of flock.
- Reportable disease in Utah.

Bacterial

Mycobacterium avium (avian tuberculosis)

Prevention:

- Depopulate flock.
- Move to new pens. Generally impossible to disinfect contaminated ground.
- Separate by age and species.
- Control rodents.
- **KEEP BREEDERS FOR ≤ 2 YEARS**

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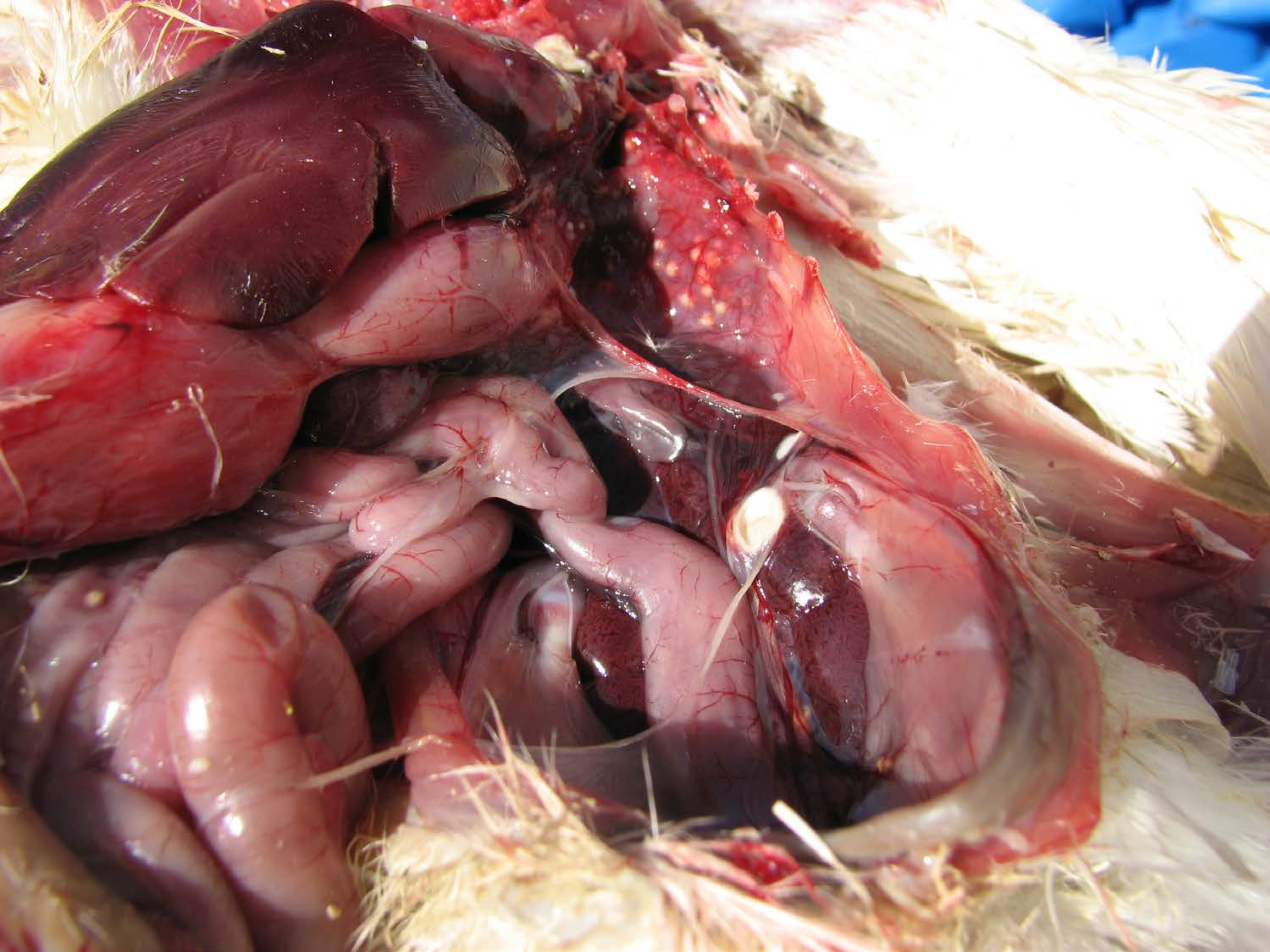
Fungal

Aspergillus fumigatus
(aspergillosis, "brooder pneumonia")

- Usually affects respiratory system.
- Can be contracted at hatchery or in brooder.
- Infection follows inhalation of large amounts of spores.
- Can cause acute death in newly hatched chicks. The organism may persist in survivors, causing later unthriftiness.



Fungal

Aspergillus fumigatus
(aspergillosis, "brooder pneumonia")

Treatment:

- No treatment has shown great efficacy.
- Tamed iodine in drinking water??
- Supportive care.

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Fungal

Aspergillus fumigatus
(aspergillosis, "brooder pneumonia")

Prevention:

- Diligent hatchery sanitation and disinfection.
- Do not re-use litter that has had a flock with aspergillosis.
- Do not use litter if you know it has been wet and then dried out again. (<u>This is the worst-case scenario</u>.) Aspen shavings seem prone to fungal growth.
- If unsure or unconvinced → spray with propionic acid products, such as Myco Curb®, etc. before chick placement.

Protozoal

Coccidiosis (generally *Eimeria* spp.)

- Coccidia are host species-specific.
- No cross protection between coccidial species.
- Characterized by enteritis, diarrhea.
- Birds look sick → SBRF syndrome.
- Water spill → exploding outbreaks possible.
- Coccidia undergo a life cycle, which takes ~ one week. Take this into account when treating.

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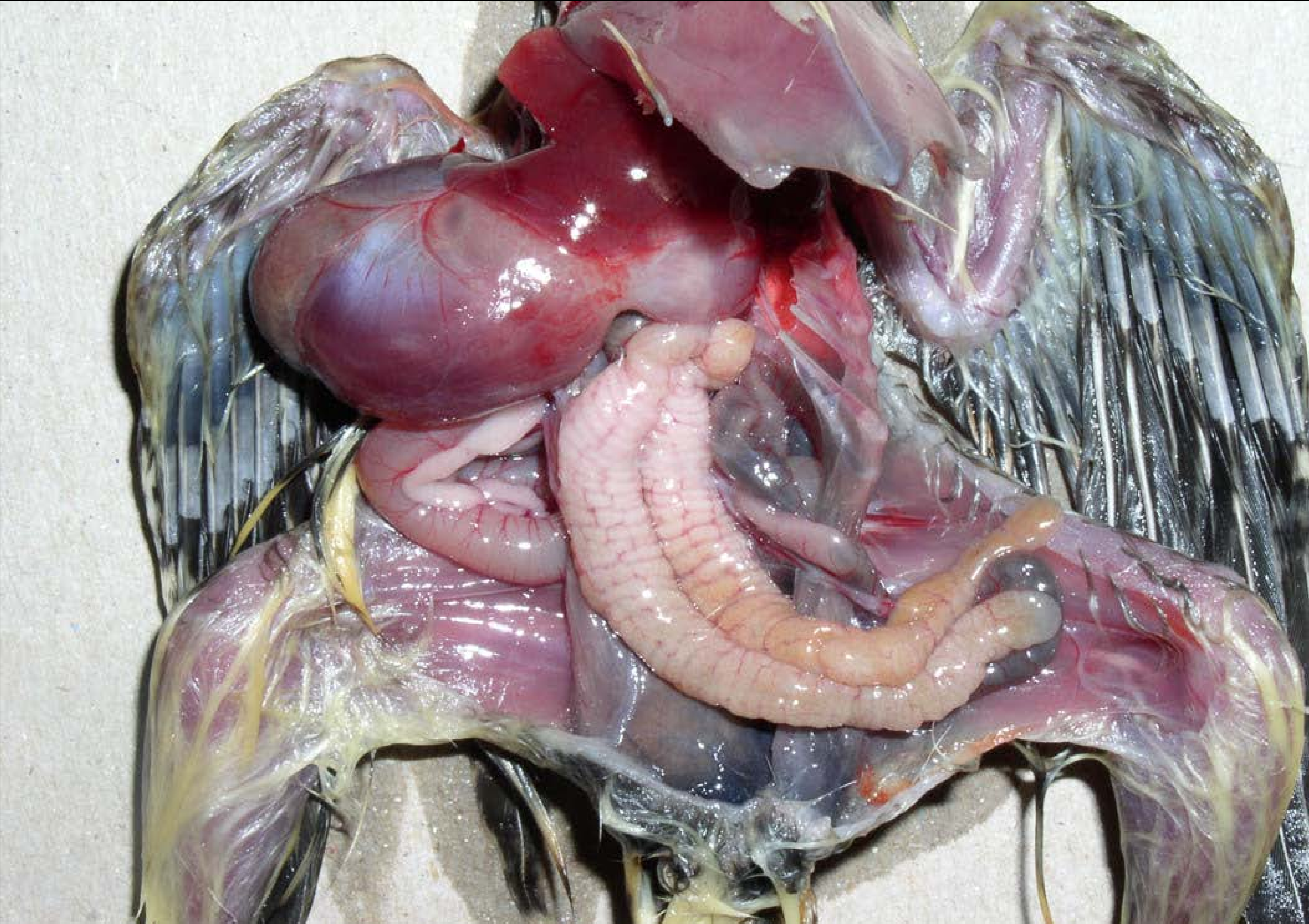
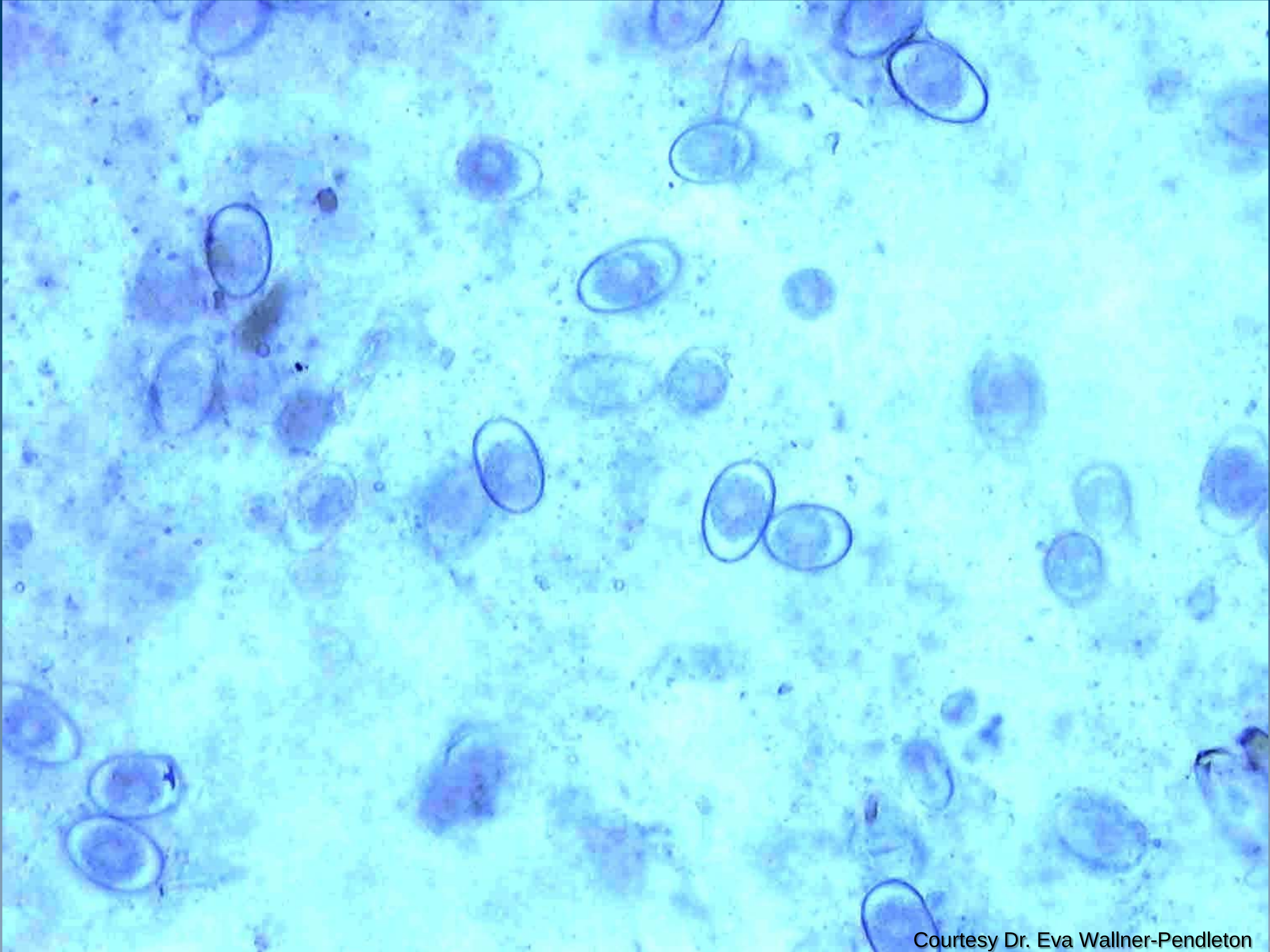
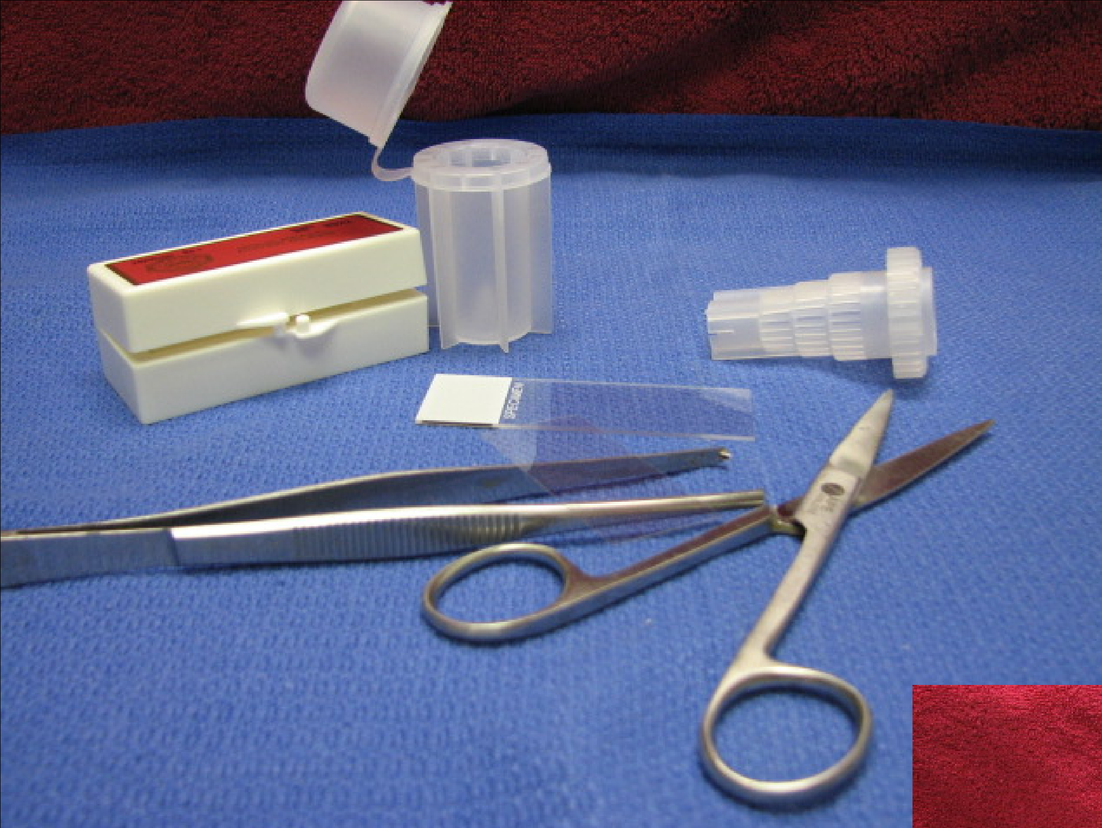


Courtesy Dr. Eva Wallner-Pendleton



Courtesy Dr. Eva Wallner-Pendleton


SPECIMEN


ACCU-SCOPE

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LITTER FLOTATION PROTOCOL

David D. Frame, DVM, DACPV

Collection

1. Grab small handfuls of litter from various locations in the building, for example under waterers, around feeders, from middle of building, etc. Collect at least five representative samples. Mix, knead, and shake them all together in a ziplock plastic bag. Make sure the composite sample is well mixed and homogenous.

2. Label bag with:
    a. Date of collection
    b. Grower name
    c. Building ID
    d. Gender
    e. Age of turkeys

3. Store sealed bag under refrigeration.

Solution (1.27 specific gravity)

H_2O . . . . 100 ml
Sucrose. . . . . 128 g

Mix and heat until all sugar is dissolved. Store in a closed container.

Procedure

1. Add 20 mL H_2O to 3 g litter.
2. Mix and strain through kitchen strainer.
3. Pour strained liquid into a 15 mL tube (e.g. plastic blood tubes with snap tops).
4. Centrifuge @ 1500 rpm for 10 minutes.
5. Decant the liquid (H20) and discard.
6. Refill tube with sugar solution.
7. Add coverslip. Let the tube with coverslip rest upright for 30 minutes.
8. After 30 minutes, gently lift coverslip from top of tube so as to not disturb the drop of accumulated debris, place on clean glass microscope slide, and read.

Protozoal

Coccidiosis (generally *Eimeria* spp.)

Treatment:

- Sulfadimethoxine (Albon®) – don't use in laying hens.
- Amprolium (Amprol®, Corid®) – use step-down dosage method in order to allow immunity to develop.

Protozoal

Coccidiosis (generally *Eimeria* spp.)

Prevention:

- Clean out litter and replace with new.
- Rotate pens/species.
- May consider coccidiostat in the feed if experiencing chronic cocci problems.

Protozoal

Histomonas meleagridis ("Blackhead")

- Chukar most susceptible of game birds; chickens often serve as subclinical carriers.
- Cheesy cores in ceca and intestines; characteristic circular depressed lesions in liver (chukars).
- The cecal worm (*Heterakis gallinarum*) and earthworms play a significant role in transmission.

Protozoal

Histomonas meleagridis ("Blackhead")

Role of *Heterakis gallinarum* (cecal worm)

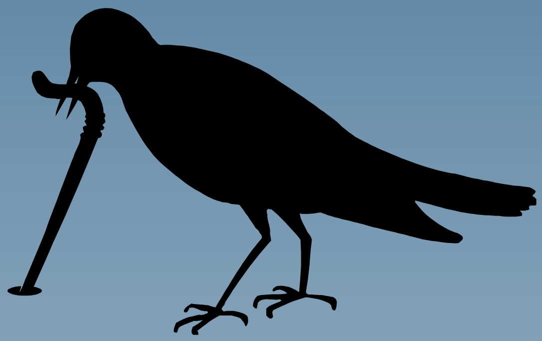
- THE mechanism for transmission from flock to flock.
- Histomonads deposited in cecal worm eggs → histomonads leave worm larvae →invade cecum → cause cecal lesions → get into bloodstream → cause liver lesions.

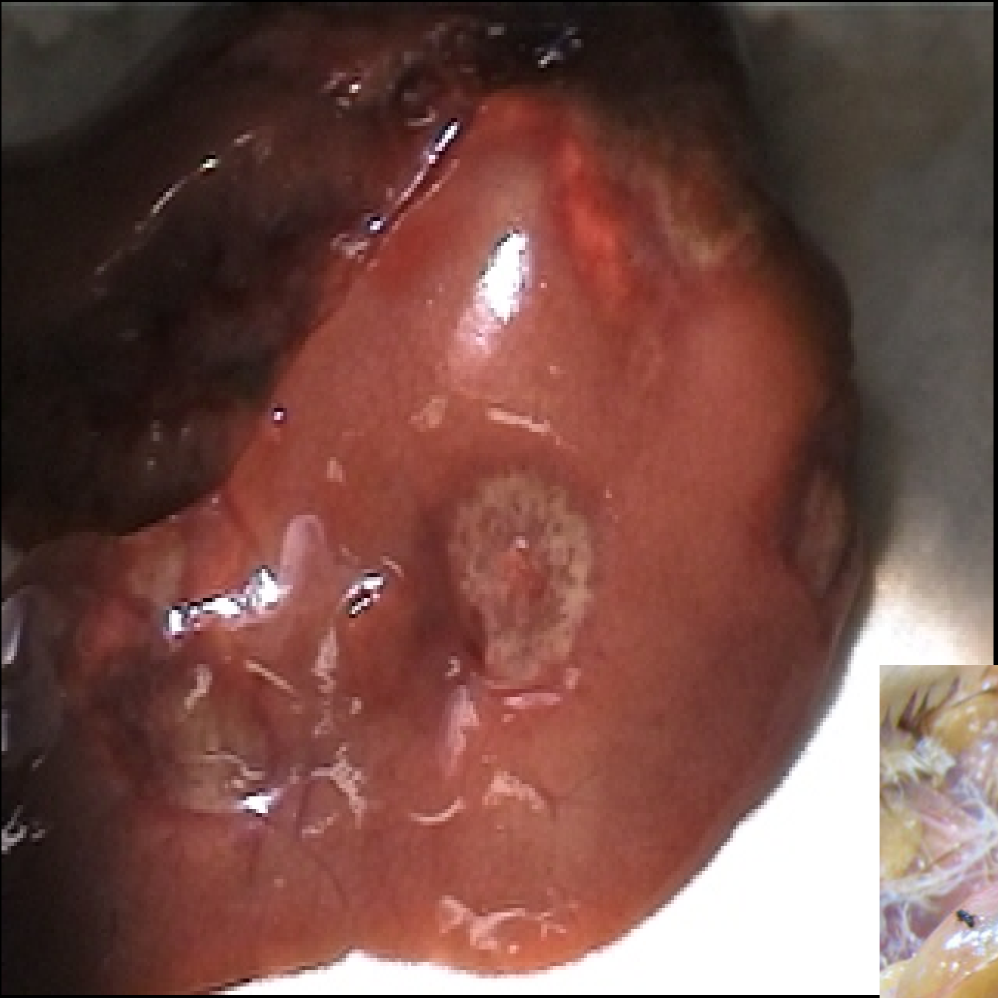
Protozoal

Histomonas meleagridis ("Blackhead")

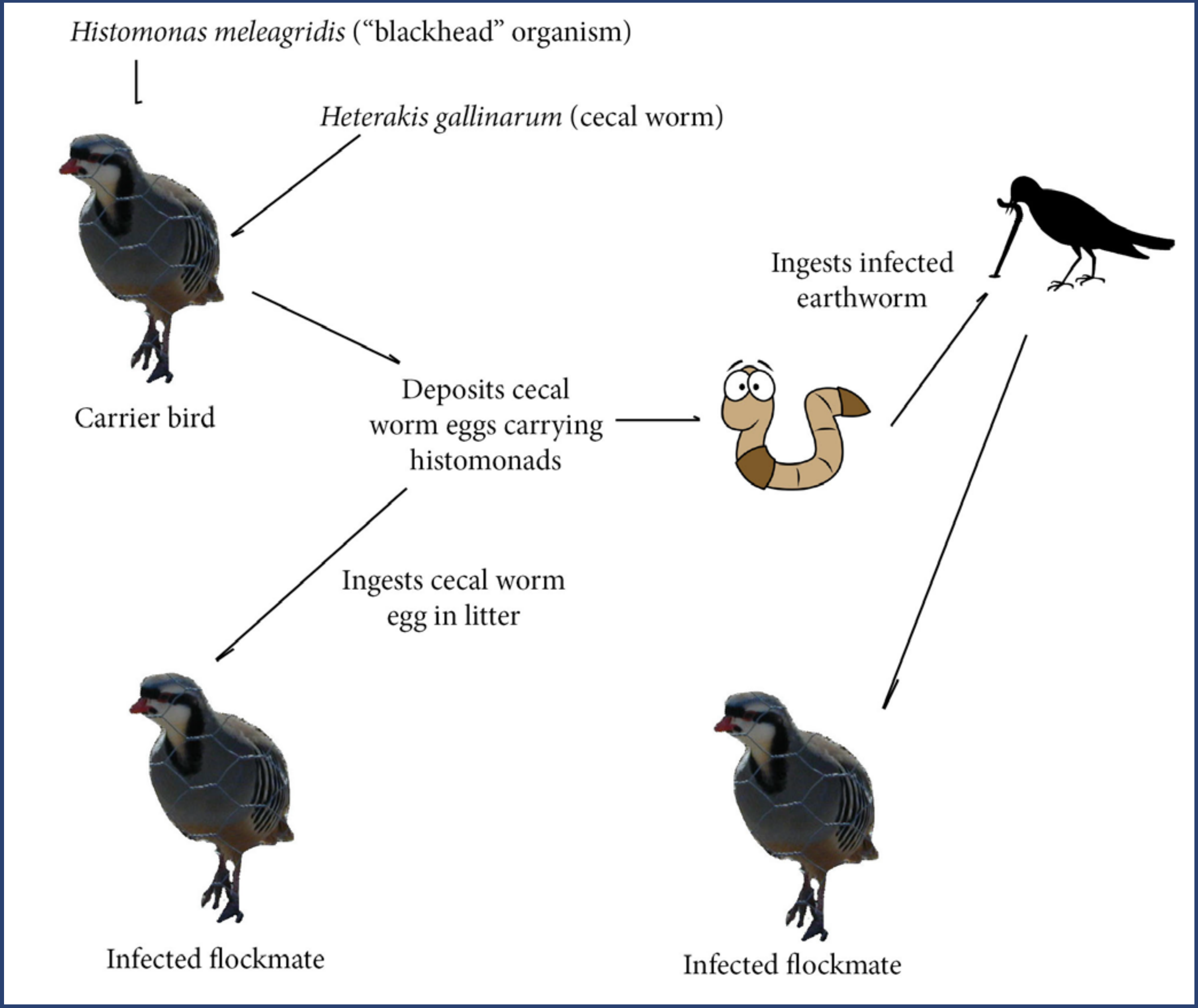
Role of earthworms

- Serve as transport host for heterakid eggs.






Transmission of *Histomonas meleagridis*



Protozoal

Histomonas meleagridis ("Blackhead")

Treatment:

- None approved
- Extra label use of metronidazole (Flagyl®) – requires licensed veterinarian. Can be expensive.

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Protozoal

Histomonas meleagridis ("Blackhead")

Prevention:

- Must control the cecal worm load.
- Mebendazole (Vermox®) or fenbendazole (Panacur®) are treatments of choice for cecal worm.
- Get birds off area where earthworms live. Put in runs with deep sand or in areas where birds can't eat the worms.

External Parasites

Northern fowl mite *(Ornithonyssus sylviarum)*
Poultry body louse (*Menacanthus stramineus*)

- Direct life cycle. Remain on bird. *O. sylviarum* can live for a few weeks off of birds after getting a blood meal.
- Rodents and wild birds serve as reservoirs for mites.
- This louse species is not specific to poultry and can be introduced through wild birds.

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26.1. (*continued*) E. Chicken body louse (*Menacanthus stramineus*). Nancy Hinkle. Photos C, D by Aubree Roche.

External Parasites

Northern fowl mite *(Ornithonyssus sylviarum)*
Poultry body louse (*Menacanthus stramineus*)

Treatment:

- Similar for both.
- Carbaryl 5% (Sevin®) – three applications, one week apart.
- Ivermectin (Ivomec® 1% injectable) – this is extra label use. Consult your veterinarian.

External Parasites

Northern fowl mite *(Ornithonyssus sylviarum)*
Poultry body louse (*Menacanthus stramineus*)

Prevention:

- Minimize contact with wild birds.
- Maintain an effective rodent control program.
- Thoroughly clean out buildings between flocks and spray with pesticide.
- For chronic problems, may need to maintain an ongoing control program using approved pesticides. Rotation is recommended.

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Internal Parasites

Tapeworms

- Flattened, ribbon-shaped segmented worms.
- Most species require an intermediate host (e.g., insect, earthworm, slug, snail).
- Most are host-specific for one or a small group of closely related birds.
- May cause enteritis, intestinal blockage, or weight loss in high numbers, but often cause no apparent damage.

Internal Parasites

Tapeworms

Treatment:

- Mebendazole (Vermox® 2.5% suspension)

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Internal Parasites

Tapeworms

Prevention:

- All efforts at control must be directed at elimination of intermediate hosts.

Internal Parasites

Roundworms (*Ascaridia* spp.)

- Life cycle is simple and direct: birds pick up eggs in litter → the roundworms mature to adulthood → take up residence in the intestines → eggs are deposited in feces → excreted out into litter.
- Heavy infection reduces thriftiness and optimal weight gain.

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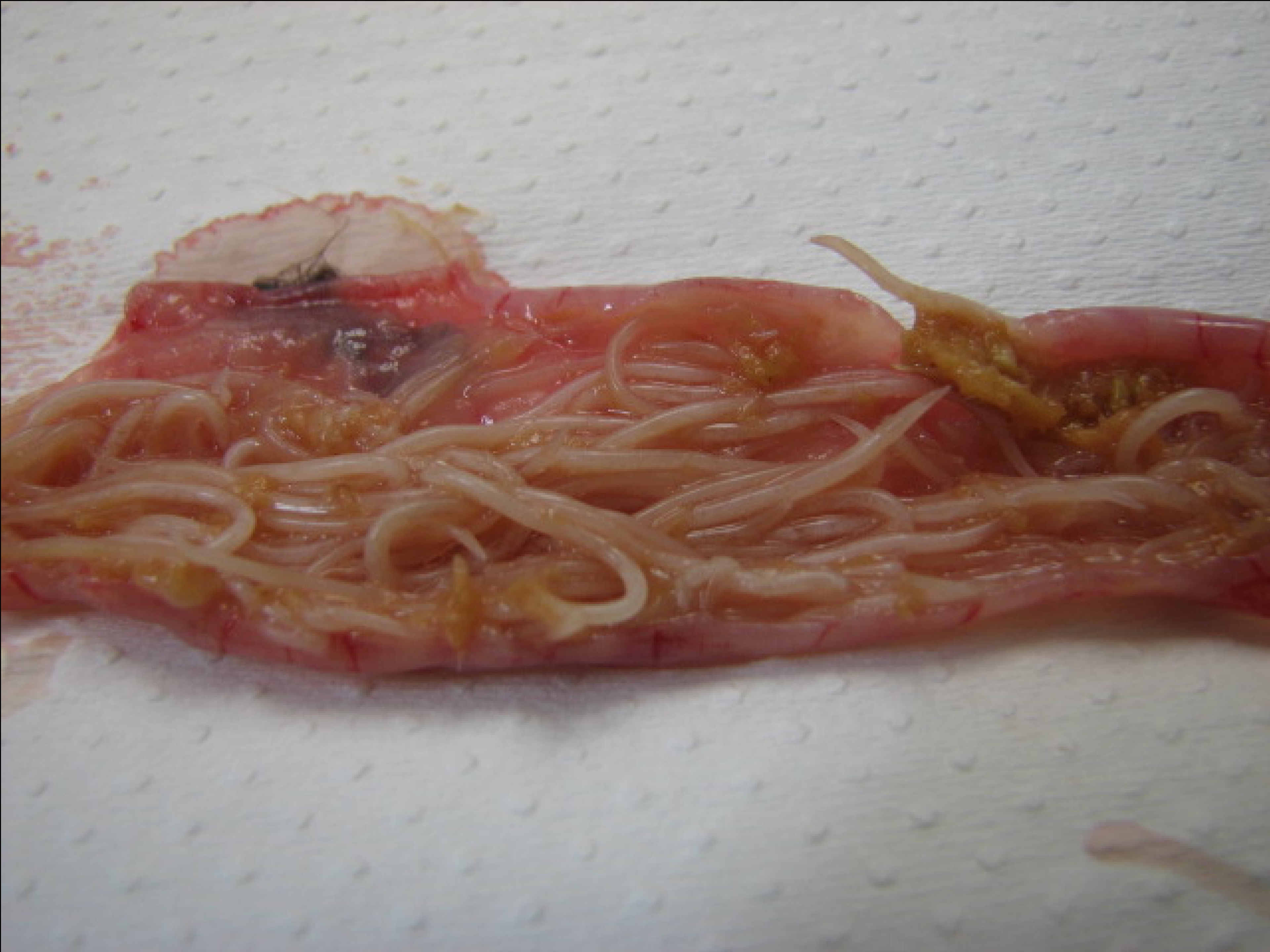

Internal Parasites

Roundworms (*Ascaridia* spp.)

Treatment:

- Piperazine (Wazine®) – losing effectiveness.
- Fenbendazole (Panacur®) – may be drug of choice, but is extra label use. Consult your veterinarian.

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Internal Parasites

Roundworms (*Ascaridia* spp.)

Prevention:

- Minimize using built-up or re-used litter.
- Floor-raised replacements: Medicate at 5 weeks of age and then every 30 days (at least 4 wormings).
- Re-used litter: medicated at 4 and 6 weeks of age.

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Internal Parasites

Threadworms (*Capillaria* spp.)

- *C. annulata* and *C. contorta*: both direct and indirect life cycles; earthworm is intermediate host; found in mouth and crop.
- *C. obsignata*: direct life cycle; found in small intestine.

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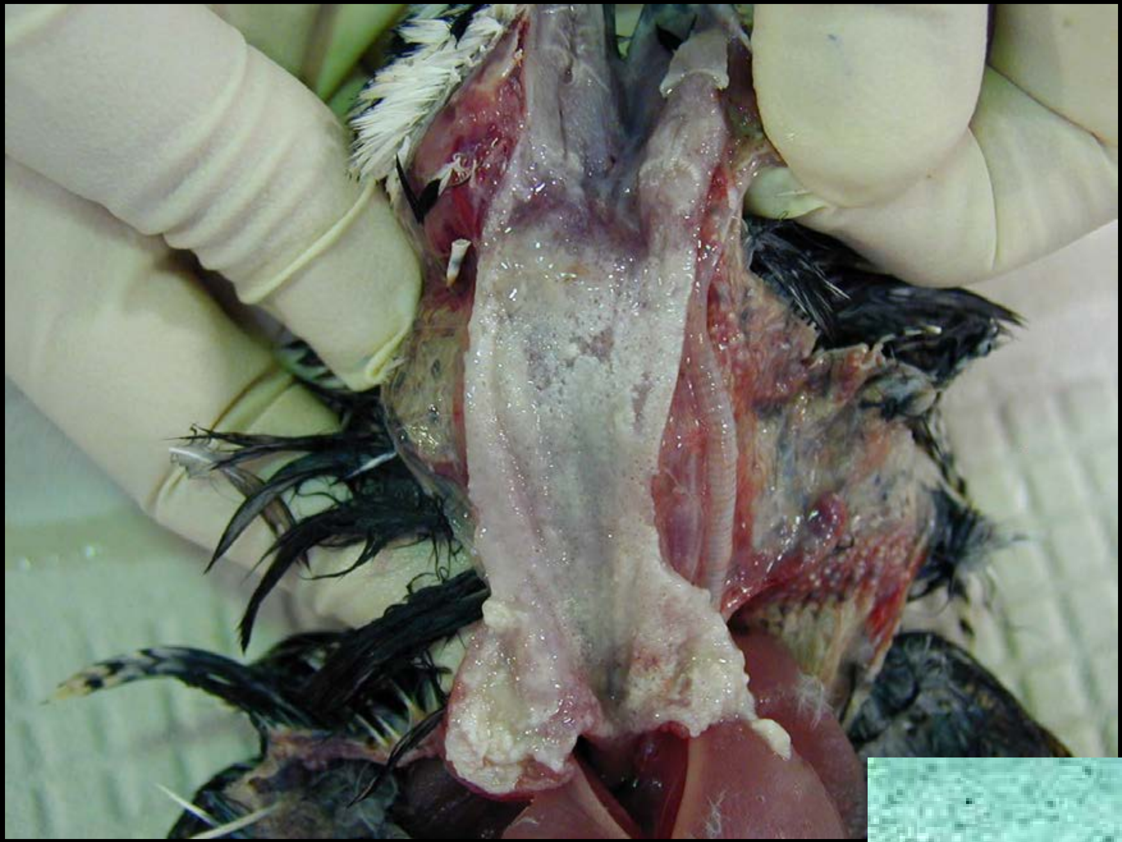

Internal Parasites

Threadworms (*Capillaria* spp.)

Treatment:

- Fenbendazole (Panacur®)
- Levamisole (Tramisole®) @ 25 mg/kg, or 0.06% in drinking water. Has 8-day withdrawal period for eggs.
- Extra label – consult your veterinarian.

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Internal Parasites

Threadworms (*Capillaria* spp.)

Prevention:

- Break the cycle: direct and indirect.
- Depopulate, remove all litter, scrape pens and remove.
- Put replacements in fresh pens. Do not add birds from flocks having *Capillaria* problems.
- Control earthworms.

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Calcium/Phosphorus/ Vitamin D Imbalances

- Rickets: found in young growing birds.

- Osteoporosis: loss of mineralization in older birds – usually only encountered in hens that are in egg production.

Calcium/Phosphorus/ Vitamin D Imbalances

Treatment:

- Immediately put a water soluble (miscible) vitamin pack in drinking water. If sure it is purely a rickets problem, specially formulated water-miscible vitamin D products are preferred (e.g., Hy•D®).
- Immediately change feed source.

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Calcium/Phosphorus Vitamin D Imbalances

Prevention:

- Rule out intestinal disease (enteritis). Treat if appropriately diagnosed.
- Analyze feed (but doesn't always tell you the story).
- Use freshly formulated feed – especially starter.


Toxic Conditions

- Botulism
  "Limberneck" not necessarily present.
  Check pen for dead carcasses and water leaks.
  Control flies.
- Lead toxicosis
  Weight loss → "wasting away", anemia (pale), +/- green diarrhea.
  Check gizzard for lead shot.
  Gizzard erosions, distended proventriculus, and basophilic stippling of immature red blood cells.

Questions?

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Avian Influenza in Game Birds

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Special thanks to:
Eva Wallner-Pendleton, DVM, MS, ACPV
Andrew R. Rhorer, National NPIP Coordinator
Fidelis N. Hegngi, DVM, MS

Influenza Virus Types

Influenza Type A

Influenza type A viruses can infect people, birds, pigs, horses, and other animals, but wild birds are the natural hosts for these viruses. Influenza type A (think A=Avian) viruses are divided into **<u>subtypes</u>** and named on the basis of two proteins on the surface of the virus: hemagglutinin (HA) and neuraminidase (NA). Only influenza A viruses infect birds, and all known subtypes of influenza A viruses can infect birds. However, there are substantial genetic differences between the influenza A subtypes that <u>typically</u> infect birds and those that infect both people and birds.

Influenza Type B

Influenza B viruses are usually found only in humans. Unlike influenza A viruses, these viruses are not classified according to subtype. Influenza B viruses can cause morbidity and mortality among humans, but in general are associated with less severe epidemics than influenza A viruses. Although influenza type B viruses can cause human epidemics, they have not caused pandemics.

Influenza Type C

Influenza type C viruses cause mild illness in humans and do not cause epidemics or pandemics. These viruses are not classified according to subtype.

Definitions

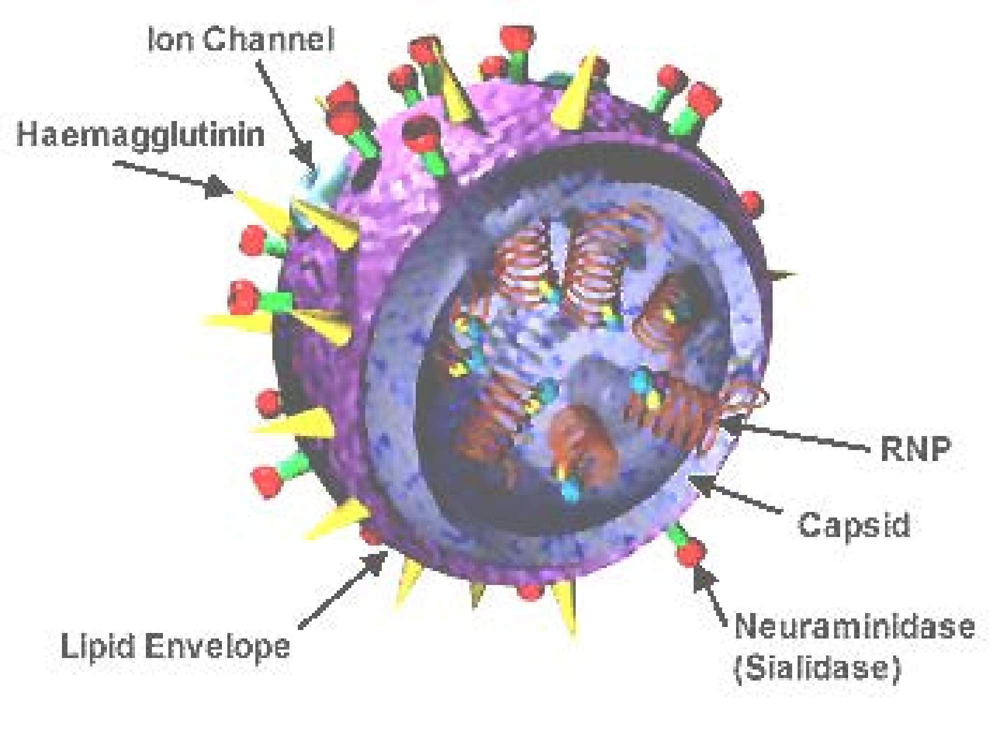
Epidemic

In epidemiology, an **epidemic** (επι (epi)- meaning "upon or above" and δεμος (demos)- meaning "people"), occurs when new cases of a certain disease …. and during a given period, substantially exceed what is expected based on recent experience. The disease is not required to be communicable. Examples of epidemics are cancer, heart disease and avian influenza. An epidemic may be restricted to one locale, a region, a country, a continent, or may become global (the latter cases are generally called a **pandemic**). A few cases of a very rare disease may be classified as an epidemic, while many cases of a common disease (such as the common cold) would not.

Pandemic

A **pandemic** (from Greek πᾶν *pan* "all" + δῆμος *demos* "people") is an **epidemic** of infectious disease that is spreading through …. populations across a large region; for instance a continent, or even worldwide. A widespread endemic disease that is stable in terms of how many people are getting sick from it is not a pandemic. Further, flu pandemics exclude seasonal flu, unless the flu of the season is a pandemic. Throughout history there have been a number of pandemics, such as smallpox and tuberculosis. More recent pandemics include the HIV pandemic and the 2009 H_1N_1 flu pandemic.

Influenza A Virus Subtypes



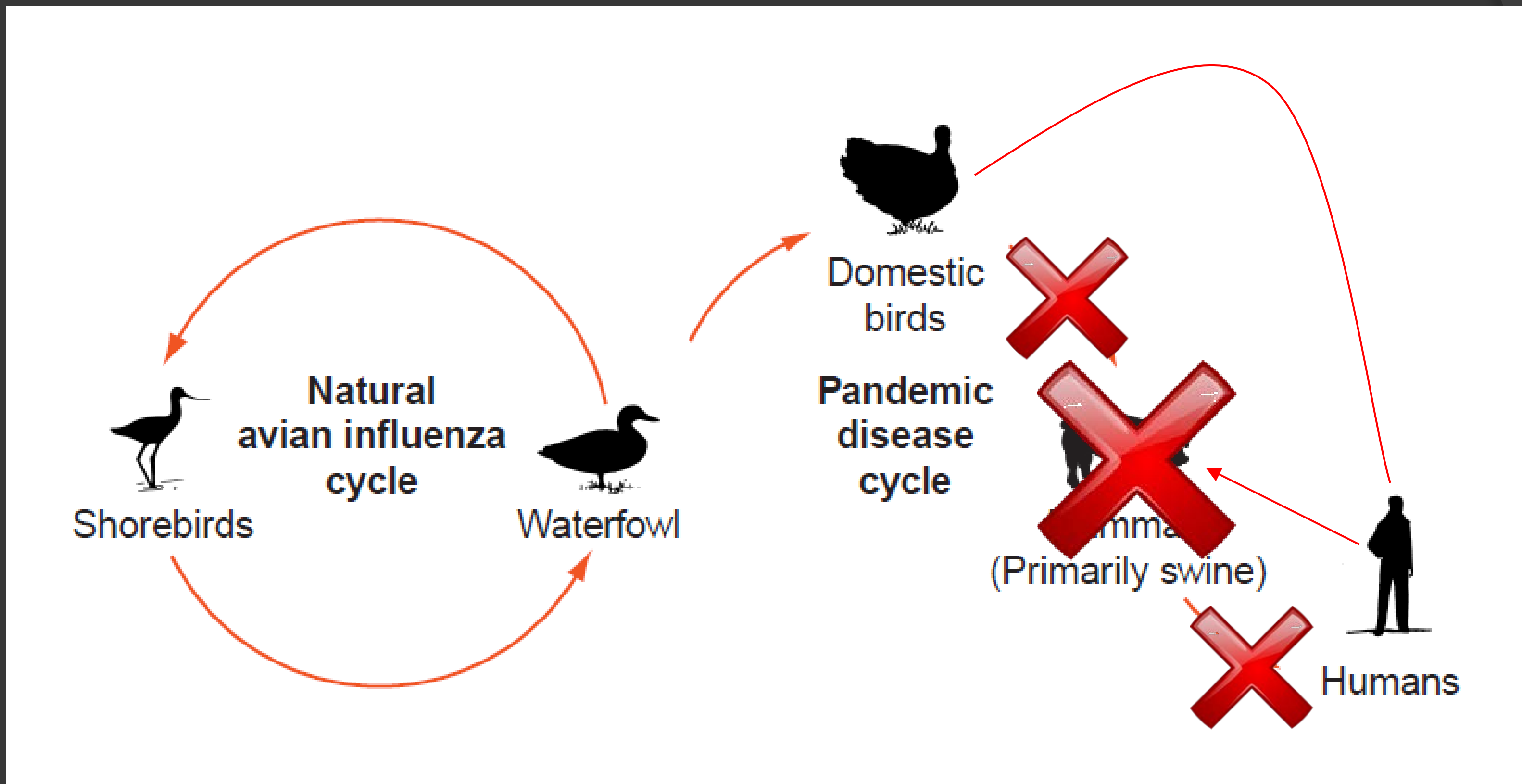
Haemagglutinin – 16 unique proteins (H_1-H_{16})

Neuraminidase – 9 unique proteins (N_1-N_9)

16 X 9 = 144 potential subtypes of Influenza A viruses

Many different **strains** within each **subtype**

Influenza A Transmission Cycle



H_1-N_1

Field manual of wildlife diseases: General Field Procedures and Diseases of Birds, 1999 USGS

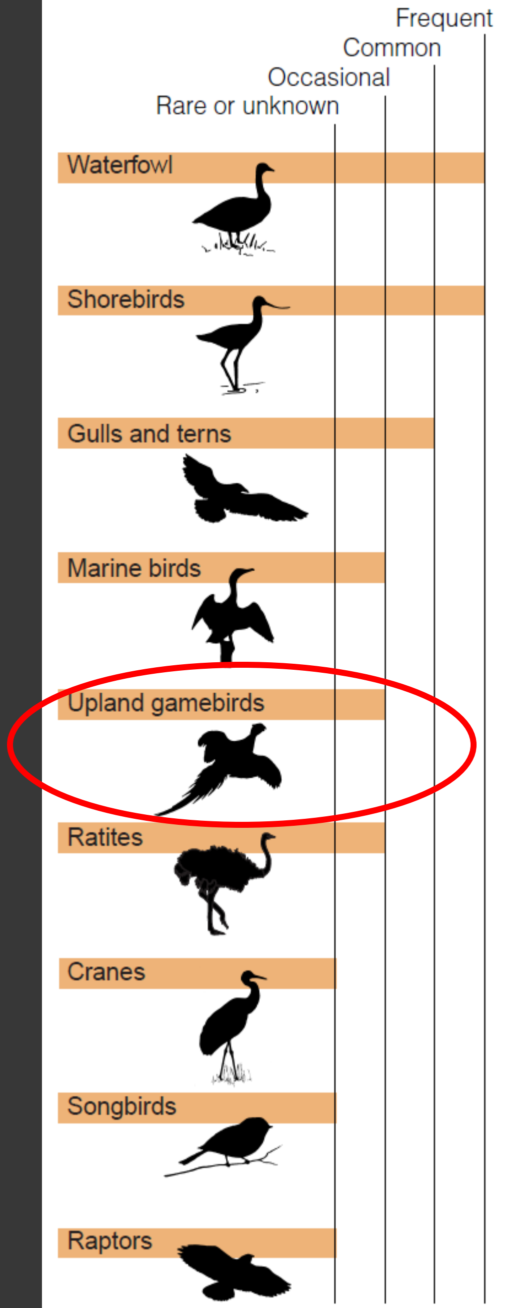


Figure 22.1 Relative occurrence of avian influenza virus in various bird groups.

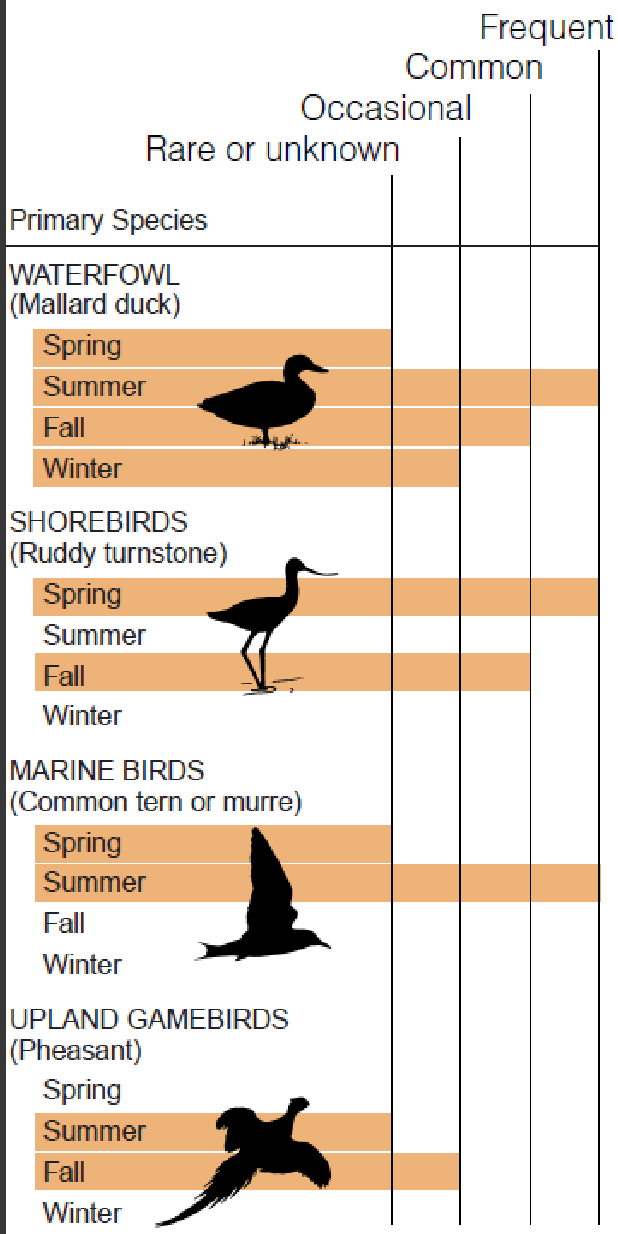


***Figure 22.3** Relative seasonal occurrence of influenza A in birds.*

Definitions

Avian influenza A virus strains are further classified as low pathogenic (LPAI) or highly pathogenic (HPAI) on the basis of specific molecular genetic and pathogenesis criteria that require specific testing.

Low Path Avian Influenza (LPAI)

LPAI typically causes high morbidity but low mortality in one or more avian species and is generally similar in humans.

High Path Avian Influenza (HPAI)

HPAI generally causes high morbidity and high mortality in one or more avian species, and may cause low or high morbidity and mortality in humans.

LPAI vs. HPAI

- Most cases of AI in birds is LPAI
- LPAI in birds can mutate to HPAI
- LPAI in humans examples are H_7N_7, H_9N_2, and H_7N_2
- HPAI in humans can be mild or severe and the same subtype can cause either extreme
  - Mild - H_7N_3, H_7N_7
  - Sever/Fatal - H_5N_1, H_7N_7

Low "Path" Avian Influenza (LPAI) in game birds

- **Most cases diagnosed through routine monitoring, trace backs, disease investigations; seroconversion, no obvious disease (PA LPAI data 2005-2008)**
- **2002: North Carolina (quail) breeders and preserves: H_7N_2 - no clinical signs or production problems observed (Dr. J. Quin, USDA)**
- **California: Japanese quail, H_6 - no disease observed (Dr. C. Cardona, U. Ca, Davis)**
- **NE markets:**
  - **$H_{10}N_7$=pheasants; H_4N_6: chukars; H_7N_7=pheasants**
  - **H_5 North American strains have become more common.**

HPAI in Game birds
(experimental data)

- **Bobwhite Quail, Pheasants, Chukars, Guinea Fowl:**
  - **Symptoms:**
    - **Paresis, paralysis, diarrhea, oculo-nasal discharge and gasping**
  - **Lesions:**
    - **Hemorrhagic intestines (mostly in guinea fowl, not so much in other breeds)**
    - **Interstitial pneumonia (all species)**
    - **Severe lymphoid atrophy (all species)**
    - **Brain histological lesions (pheasants, chukars, quail most pronounced)**
  - **Mortality**
    - **Chukars (least susceptible - 75% mortality over 14 days)**
    - **100% (all other gallinaceous birds)**

Perkins and Swayne, Vet Pathol 38 (2001) 149-164

Gamebirds with recorded H_5N_1 Susceptibility

Scientific Name	Common Name	Wild	Captive / Sanctuary	Domestic Pet	Experimental	Mortality	Source Used
Order: Galliformes							
Alectoris chukar	Chukar partridge				+	+	Perkin and Swayne, 2001. Vet Pathol 38:149-164.
Colinus virginianus	Bobwhite quail				+	+	Perkins and Swayne, 2003. Vet Pathol 40:14-24.
Coturnix coturnix	Quail			+	+	+	Perkins and Swayne, 2003. Vet Pathol 40:14-24.
Gallus domesticus	Domestic chicken			+	+	+	Subbarao et.al. 1998. Science 279:393-396.
Lophura leucomelanos	Kalij pheasant	+				+	Keawcharoen et al., 2005. A. Virol 49:277-280.
Meleagris gallopavo	Turkey			+	+	+	Perkin and Swayne, 2001. Vet Pathol 38:149-164.
Numida meleagris	Pearl guineafowl			+	+	+	OIE, 4/4/2006; Perkins and Swayne, 2003
Pavo cristatus	Peacock		+			+	Danish Tests Reveal H5N1 Virus In Poultry
Pavo cristatus albus	White Indian peafowl	+				+	Keawcharoen et al., 2005, Pers. Comm.
Phasianus colchicus	Ring-necked pheasant				+	+	Perkin and Swayne, 2001. Vet Pathol 38:149-164.

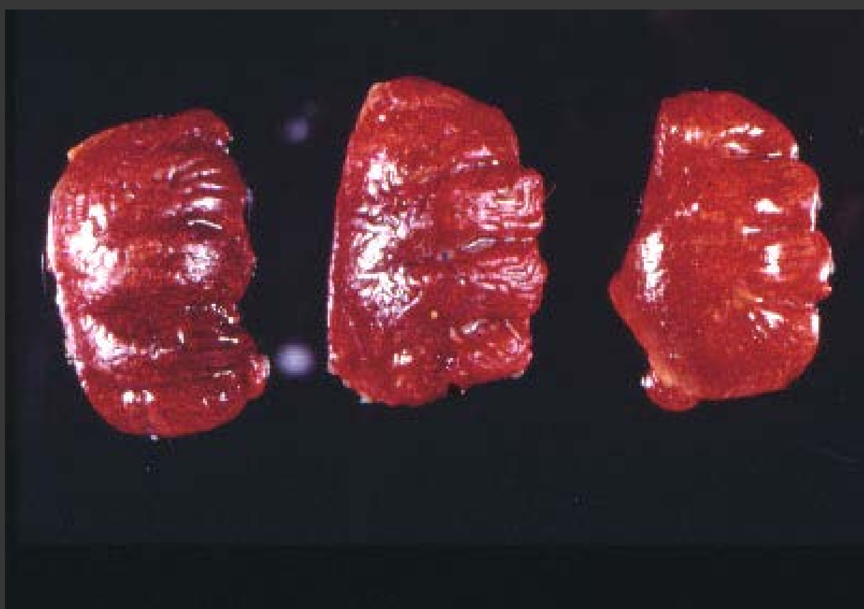
High “Path” Avian Influenza (HPAI) in game birds

- Game birds are fully susceptible to HPAI but appear to survive longer than chickens before dying
- Vector potential??
- Facilitate adaptation of waterfowl strains to poultry?? Perez et al.

Which is the AI Infected trachea and which trachea has Infectious Laryngotracheitis?

You Can’t Tell by Gross Examination!

Which is the AI infected lung and which is infected with Infectious Laryngotracheitis Virus?



You Can't Tell by Gross Examination!

Take Home Points

- A clinical respiratory disease observed in game birds is most likely <u>NOT</u> LPAI in North America.
- A significant sudden die-off <u>COULD BE</u> HPAI and state vet should be contacted immediately.
- Necropsy, bacterial cultures, antigen detection tests, virus isolation, histopathology are usually needed to differentiate the cause of the illness.
- The only thing typical about AI is there is nothing typical about AI….

Risks to a $5 Billion Industry

Game Bird Husbandry and Management

Brooding to 5-6 weeks in confinement.

From ~ six weeks on birds are raised in semi-confinement under netting.

Chukars and quail raised off the ground when possible

Bio-Security

Good Practices

- Having a written plan
- Controlling access to premise
- Appropriate PPE
- Controlling wildlife contact
- Proper Sanitation
- Purchasing from NPIP suppliers
- Testing birds ANYTIME there is an increase in death/production rates

Poor Practices

- <u>NOT</u> doing <u>Good</u> Practices
- Allowing employees to have contact with other birds (home, LBM)
- Housing multiple species together
- Borrowing equipment from other breeders/farms

Overall disease incidence in game birds at production facilities and preserves

- Very similar to those problems seen in backyard and floor- raised poultry.
- Diseases of intensification have increased.
- Industry has had tremendous growth.
- Biosecurity awareness present (AI CAP project) but not at level of commercial poultry operations: bird hauling, crates, customers/visitors, multi-ages, multi-stages, multi-species.
- Typical production facility may supply birds to multiple states.
- Hunting preserves: mixing of birds from multiple sources, life expectancy~ 1 to 2 weeks
- Surprisingly, AI is very rare in commercial facilities, 1 inch netting keeps out waterfowl and larger birds.

National Poultry Improvement Plan

- Game Bird <u>Breeding Flocks</u>
  - Part 145 Subparts A&E
    - Designations
      - U.S. Pullorum-Typhoid (PT) Clean
      - U.S. Mycoplasma Gallisepticum (MG) Clean
      - U.S. Mycoplasma Synovia (MS) Clean
      - U.S. H_5/H_7 Avian Influenza Clean

National Poultry Improvement Plan

- Game Birds <u>Raised-for-Release</u>
  - Part 146 Subparts A&E
    - Designations
      - U.S. H_5/H_7 Avian Influenza Clean

H5/H7Avian Influenza Clean Turkeys, Waterfowl, Exhibition Poultry and Upland Gamebirds Breeding Flocks

- Primary- A minimum of 30 birds would have to have been tested negative for antibodies to avian influenza when the flock is more than 4 months of age to qualify. After qualification, a sample of at least 30 birds from the flock would have to be tested negative at intervals of 90 days to retain the classification.
- Multiplier- After qualification, a sample of at least 30 birds from the flock would have to be tested negative at intervals of 180 days to retain the classification.

H5/H7 Low Pathogenic Avian Influenza Monitored Program

- Active Surveillance Program for
  - Meat-type Waterfowl, and Gamebirds
  - Raised-for-release Waterfowl and Gamebirds
- Diagnostic Surveillance Program
  - 30 birds tested negative from premise every 90 days
- State Initial Response Plan
  - Bird H_5 and H_7 in **Utah Avian Influenza Response Plan**
    - All H_5 and H_7 positive tests will be reported to the state
    - All HPAI will be depopulated
    - LPAI may be depopulated or monitored and sent to slaughter

Other Requirements Needed in AI State Response Plan

- Initial State Response and Containment Plan
  - Standing emergency disease management committee
  - Minimum biosecurity plan
  - Public awareness and education programs
  - Detailed procedures for initial handling and investigation of suspicious cases
  - Strict Quarantine
  - Control/Monitoring Zones
  - Access to adequate diagnostics
  - Detailed depopulation and disposal plans
  - Detailed plans C & D, repopulation and monitoring

NPIP Avian Influenza Surveillance Summary by Subpart (2008)

Subpart	No. Flocks	No. Birds	No. Tests
Egg-Type Chicken Breeders (G)	**182**	**3,358,794**	**20,724**
Table-Egg Layers (B)	**3,425**	**257,835,389**	**179,915**
Meat-Type Chicken Breeders (H)	**5,145**	**87,287,608**	**653,540**
Meat-Type Chickens Commercial (C)	**141,112**	**8,705,025,422**	**1,481,470**
Turkey Breeders (D)	**631**	**5,797,789**	**57,226**
Meat-Type Turkeys (D)	**14,873**	**200,688,775**	**226,477**
Waterfowl, Upland Gamebirds, Ex. Poultry (E)	**1,313**	**13,532,425**	**103,751**
Total	**166,681**	**9,273,526,202**	**2,723,103**

Indemnity

- The Program provides for indemnity of infected premises.
- APHIS is authorized to pay 100 percent of eligible costs related to infected or exposed commercial and breeding poultry and 100% of cost of depopulation, C&D, and disposal as referenced in 9 CFR part 56 from participating flocks in States that:
  - Participate in an APHIS approved diagnostic surveillance program for H5/H7 LPAI
  - Have APHIS approved Initial State Response and Containment Plan
- Commercial or breeder flocks that do not participate in NPIP provided 25 percent compensation for eligible costs.

Contact Information

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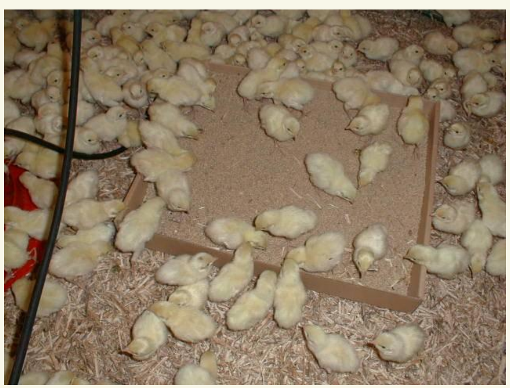
Riverdale, MD 20737-1231

Mac Farlane
Established 1929

MacFarlane Pheasants, Inc.

Utah Symposium 2013

MacFarlane Pheasant s, Inc. is a family owned and operated business. Since our farm was established in **1929**, it has become the largest gamebird farm in the United States. We are primarily a pheasant farm: breeding, hatching and raising pheasants.



Our commitment to quality shows in our quest to produce the best products for our customers. We have imported flocks direct from China and crossed them with our own to create the **Manchurian Cross™.** This was done so that the hardiness of the birds could rival native birds. We hand select every breeder on our farm, and we have set up a genetic facility for our meat birds which helps provide fresh birds year around as well as higher yields in breast meat

www.pheasant.com

MacFarlane Pheasants, Inc • 2821 U.S. Highway 51 South • Janesville, WI • 53546
macfar@pheasant.com • Fax # 608-757-7884 • 1-800-345-8348

MacFarlane Pheasants, Inc.

Founder

Donald J. Mac Farlane, a graduate chemical engineer, after spending 11 years working for a large industrial organization, felt the need of establishing himself in his own business, preferably one in which he could combine his love of the great outdoors with a means of making a livelihood. His brother Kenneth, who had started a pheasant farm nine years before in 1929, and had made a good thing of it, urged Don to go back to their hometown, Janesville, Wisconsin, and start a pheasant farm next to his. So, in 1938 Don moved back to Janesville, Wisconsin and got into the pheasant business. In 1941 the two farms were merged and continued on to be known as Mac Farlane Pheasant Farm. Today the company continues on under the direction of Don's son Bill Mac Farlane.

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MacFarlane Pheasants, Inc.

History

1940

MacFarlane Pheasants, Inc.

History

1960's

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MacFarlane Pheasants, Inc.

History

1996

MacFarlane Pheasants, Inc.

Aerial Pictures 2013

MacFarlane Pheasants, Inc.

Aerial Pictures 2013

MacFarlane Pheasants, Inc.

Hatchery

The first hatchery

The first few years

Since 1988

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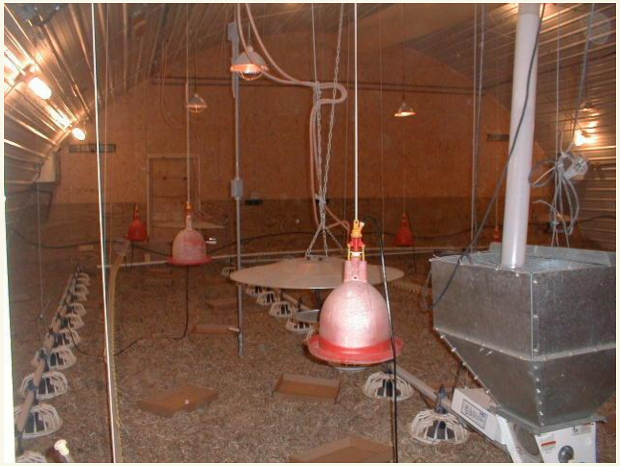
hatchery@pheasant.com • Fax # 608-757-7884 • 1-800-345-8348

MacFarlane Pheasants, Inc.

Brooder



Birds were first hatched and cared for by broody chickens. Then they were raised in small building as seen in the 1960's picture on the History page. Now they are raised in rooms as seen on the bottom right with 7000 per room. Most controls are automatic as seen below.

Controls

Paragon timer

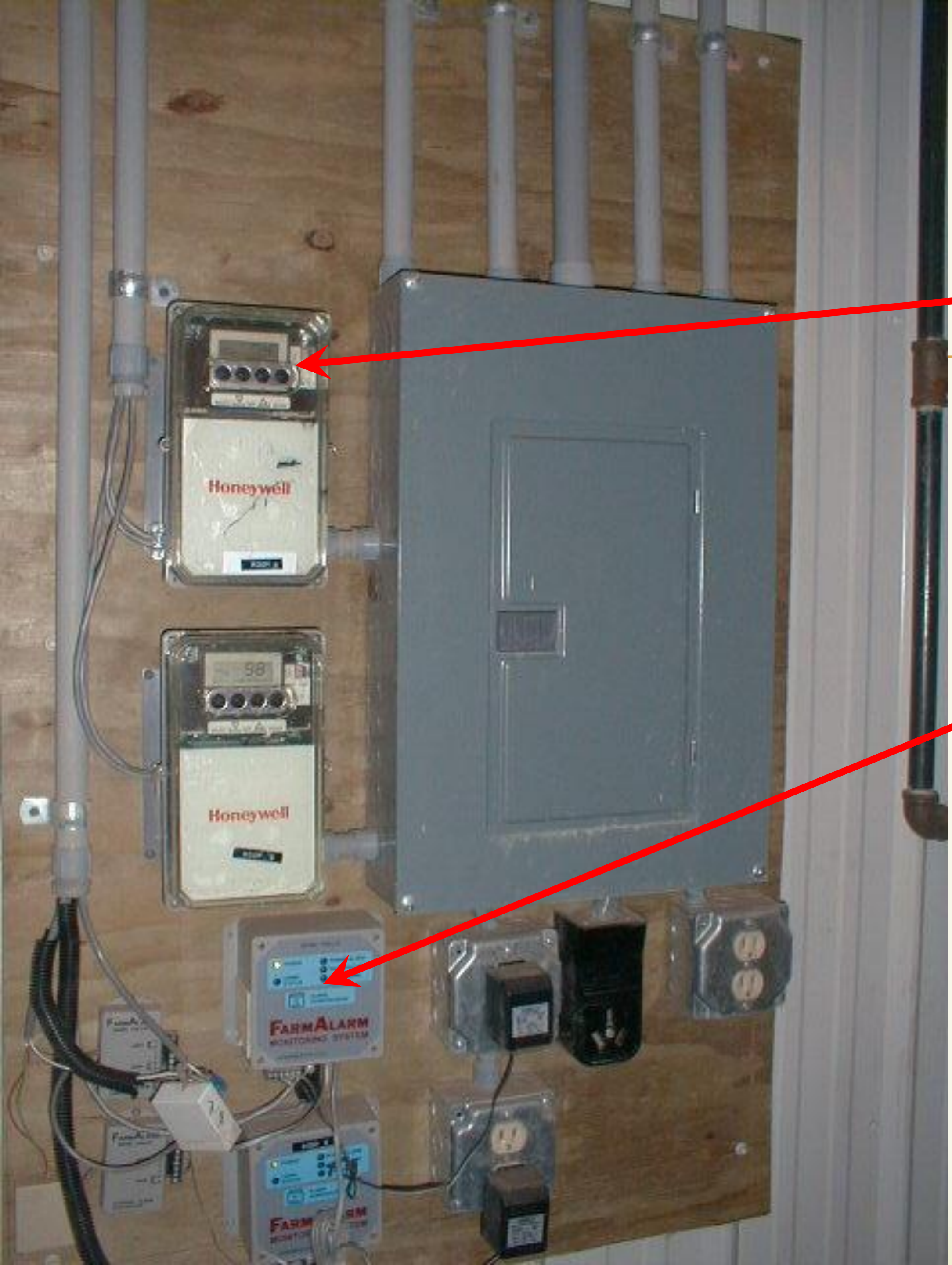
- Automatically turns lights on/off
- Helps activate the birds

Dimmer switch

- Allows different light intensity
- Keeps aggressiveness down

Override timer

- Allows for human error



Controls

<u>Honeywells</u>

- Heat stage
- Fan stages
- Visual read out

<u>Farm Alarm</u>

- 24/7 supervision
- heat
- water
- power
- phone

MacFarlane Pheasants, Inc.

Pens

Here at MacFarlane's we take pride in our service with the sale! There are several frequently asked questions below, if you do not find the answer feel free to either e-mail us or give us a call.

Our birds are placed in large flight pens at 6-7 weeks of age. Each pen has its own feeders and waters. A composter provides us with a secure way of disposing of dead birds.

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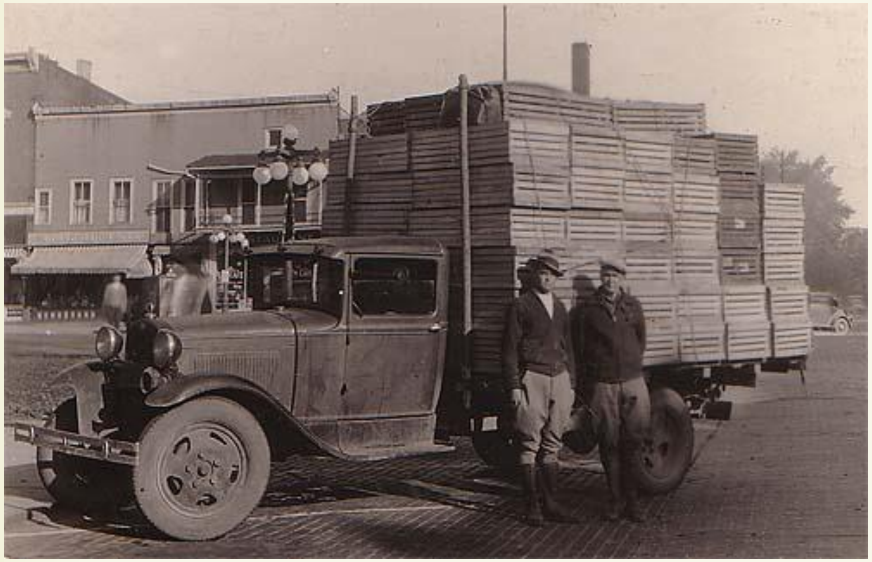
penmanager@pheasant.com • Fax # 608-757-7884 • 1-800-345-8348

MacFarlane Pheasants, Inc.

Transportation

Way back when…



…then…

Now!!

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maintenance@pheasant.com • Fax # 608-757-7884 • 1-800-345-8348

Chukar Redleg

White Ringneck

Hungarian Partridge

Pure Manchurian™

Ringneck

Mutant

Ring-Neck Rooster

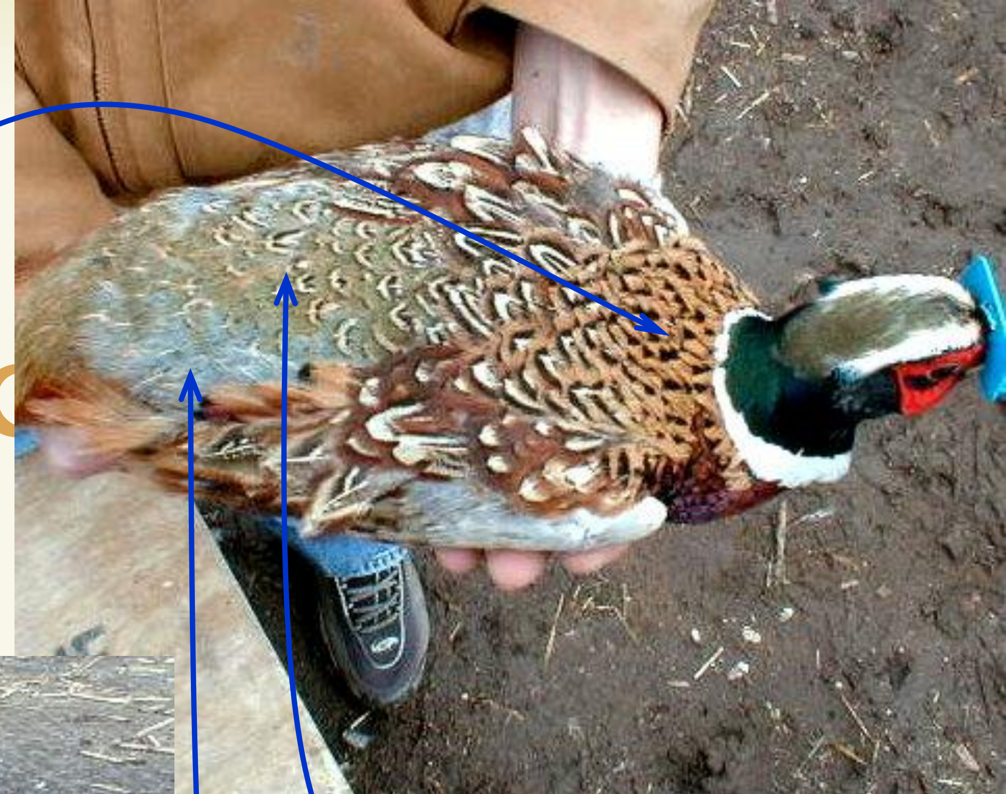
Weight: 2.9-3.2 lbs..

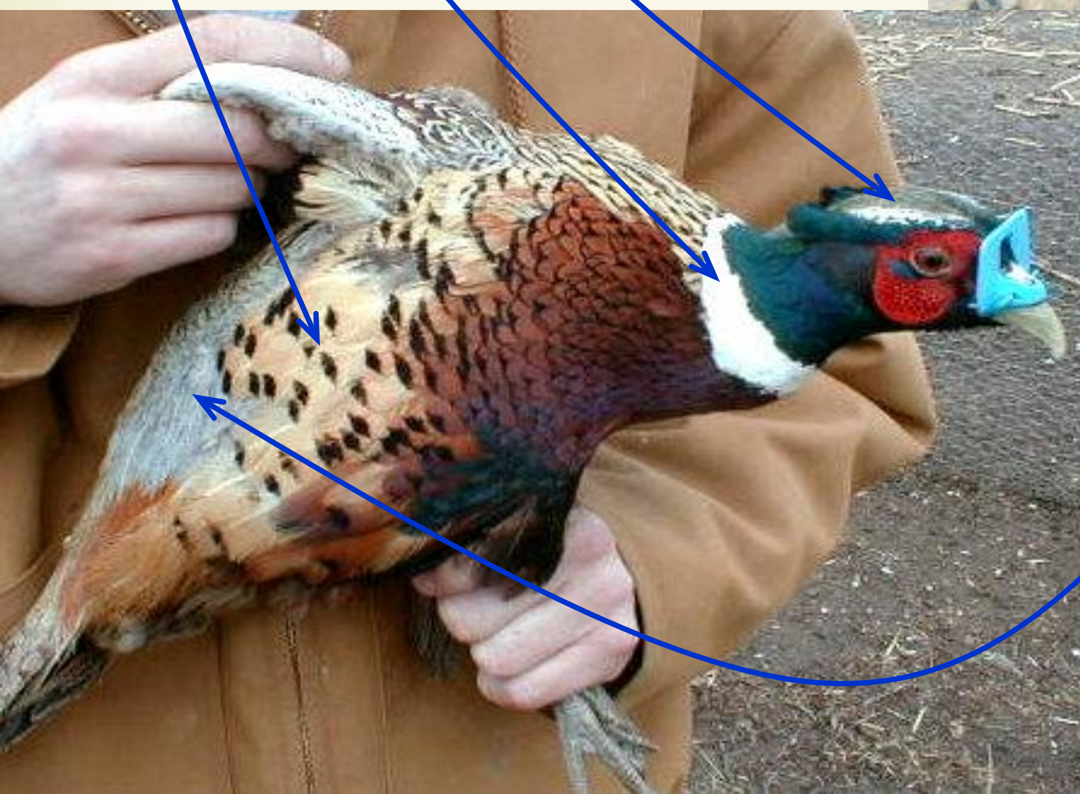
Yellow Sides

Shoulder

Neck Ring

Racing Stripes





Green Stripe

Blue Flank

Pheasant for Dinner

Our food products area is supported by genetic facility that allows us to have fresh product year round as well as the ability to select for birds that will hold more meat. The white bird is our primary meat bird at MacFarlane's.

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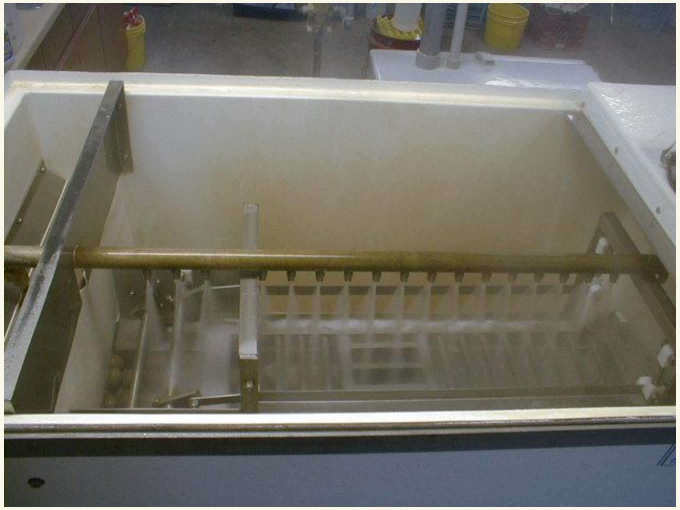
dressedpheasants@pheasant.com • Fax # 608-757-7884 • 1-800-345-8348

MacFarlane Pheasants, Inc.

Egg Sanitation

Here at MacFarlane's we take pride in our service with the sale! There are several frequently asked questions below, if you do not find the answer feel free to either e-mail us or give us a call.

All eggs are washed in our state of the art egg washer. The dirt and grime is washed off and then the eggs are disinfected using a Quat sprayer pictured on the bottom. After that they are sorted for culls and sent to the hatchery.



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breeder@pheasant.com • Fax # 608-757-7884 • 1-800-345-8348

MacFarlane
Established 1929

MacFarlane Pheasants, Inc.

Success Stories

Pheasant For Dinner

Pure Manchurians from China

Updated Website

Taxidermy Quality Specimens

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dressedpheasants@pheasant.com • Fax # 608-757-7884 • 1-800-345-8348

MacFarlane Pheasants, Inc.

Core Values

Humane treatment of our birds

Customer Satisfaction

Business Profitability with Integrity

Employee Job Satisfaction

Stewardship of the Earth

Community Involvement

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Utah Symposium 2013

MANAGEMENT OF PHEASANTS IN THE FLIGHT PENS

Six weeks of age until maturity

The Plan

- Decide where first birds will go
- Till and plant those pens first
- Determine how many birds to put in each pen
- Set up the pens
- Move out the birds
- Take care of the birds

HOW TO MOVE OUT BIRDS (Barn Setup):

- Pressure wash crates
- Build catch pen inside barn
- Put pressure washed crates inside

HOW TO MOVE OUT BIRDS (Catching):

- 4 or 5 person catching crew
- 2 or 3 person dumping crew
- Birds are sexed into the crates
- 15 birds per crate
- Use cardboard to drive birds

Preparation Of The Flight Pens

- Pen maintenance
- Feed and water
- Shelter and cover
- Misc.. Items

Pen Maintenance

- All gates checked and secured
- Division fences checked for integrity
- Roof double checked for holes

Feed Requirements

- 1 feeder for every 100 bird
  - .7" of feeder space per bird
- Supplemental feeder and pans in front of the pens
  - 1 feeder
  - 4 feed pans for every pen

Water Requirements

- 1 plasson for every 250 birds
- Water pans in the front of pens
    - 1 pan for every 100 birds

Shelter Requirements

- 1 hut for every 100 birds
- Use when cover is <18” tall
- Straw huts

Cover

- Weeds for early birds
  - Lambsquarter
- Corn or corn/sorghum mix later
- Mow paths
  - birds need open space

Planting

- Plant corn early
- Plant corn/sorghum mixture late
- Use a 5 row planter
  - broadcasting makes plants spindly

Square Footages

- Early birds (before 4/15 hatch)
  - 30 square feet for hens
  - 40 square feet for cox
- Late birds (after 4/15 hatch)
  - 18 square feet for hens
  - 24 square feet for cox

Other Precautions Taken for Young Birds

- Straw all 4 corners of pen
- Put feed pans under huts
- Put coccidiostat in the front feeders
- Add vitamins to the supplemental water pans

When Do You Decide To Move Out Young?

- Weather!
- Health of the flock
- Size of the flock
- Status of the flock behind it

Weather

- 3 days without rain
- Temperature
  - Above 50 degrees when possible
- Be flexible

Health of the Flock

- Don’t move sick birds
- Wait 1 week after peeping

Flock Size

- Move crowded birds A.S.A.P.
- What is the flock size behind this group

Other Considerations

- Time of the year
- Extended forecast
- Health and size of flock behind current flock

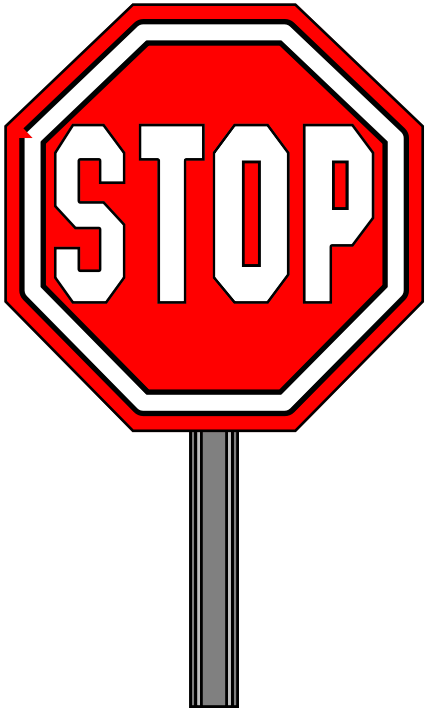
Should I or Shouldn't I??

- Temp: 40 F
- Month: April
- No rain expected
- Age: 6 weeks
- Flock size: normal
- Bird health: good

- YES

Should I or Shouldn't I??

- Temp: 40 F
- Month: May
- 50% chance of rain
- Age: 6 weeks
- Flock size: normal
- Bird health: good



Always Move Birds Out In The Morning!

Don’t dump birds into pens during the late evening

Care After the Brooder Barns

- Disease Control
- Worming
- Predator control
- Pest control
- Observation

Disease Control

- Dead check on a weekly basis
- Keep accurate records
- Keep feeders clean

Worming birds

- Worm all second use pens
- Wet pens may need to be wormed more than once
- Dry pens may not need to be wormed at all
- Watch the birds for signs
- Use panacur through the water

Predator control

- Hawks and Owls
  - catch strays on a daily basis
- Fox and Coyotes
  - trapping program
- Opossum and Skunk
  - prevent dig-ins
  - keep gates closed at all times
- Mink

Pest Control

- Mice and Rats
  - create and implement a plan
- Starlings
  - pre-bait and poison
  - scare devices

Observation

- Drive around pens twice daily
- Pay attention to the smallest details
- Keep accurate records

SUMMARY

- Move out young birds in a timely manner
- Cover and feeder space are the two key factors in raising birds
- Check your birds often
- Use common sense - do not ignore your gut feeling

MANAGING YOUR GAMEBIRD OPERATION

UTAH SYMPOSIUM 2013

BILL MACFARLANE

TODAY'S GAME BIRD MARKET

- Highly competitive
- Harder to delineate one's product (uniform higher standards in our industry)
- Price sensitive
- Flat demand

A JOB OR A BUSINESS

Are you running your business or is your business running you!

If you rely on “end of the year profits” as your payment for your labor – your farm is your job.

Pay yourself a salary AND budget your business to make a profit on top or your salary.

OR

RUNNING YOUR BUSINESS AS A BUSINESS.

- Budgets
  - -Labor
  - -Expenditures
  - -Income
- Lock in as many input costs as you can
  - -Feed
  - -Labor
  - -Propane

After you know your costs THEN determine the price you will charge for your birds

BE REALISTIC

If the commercial operations aren't cutting the corner – why do new producers think they can

Know your costs – e.g. delivery costs

Being a game bird producer is not a "get rich" strategy

BECOMING MORE EFFECTIVE AS A PRODUCER

There is no room for producers who are complacent and comfortable (not taking any risks).

Complacent producers will be forced out of business

GAME BIRD PRODUCTION

Progressive producers who are open minded and willing to try new methods will survive.

If you are here at the meeting, you most likely tend to be more progressive.

GAME BIRD PRODUCTION

To be successful – you will need to get out of your comfort zone and take a few risks.

Try some new methods

Take a good hard look at every part of your business to see what you might improve

AWARENESS AND OPENNESS

- **Denial**
- **Recognition**
- **Acceptance**
- **New Methods**

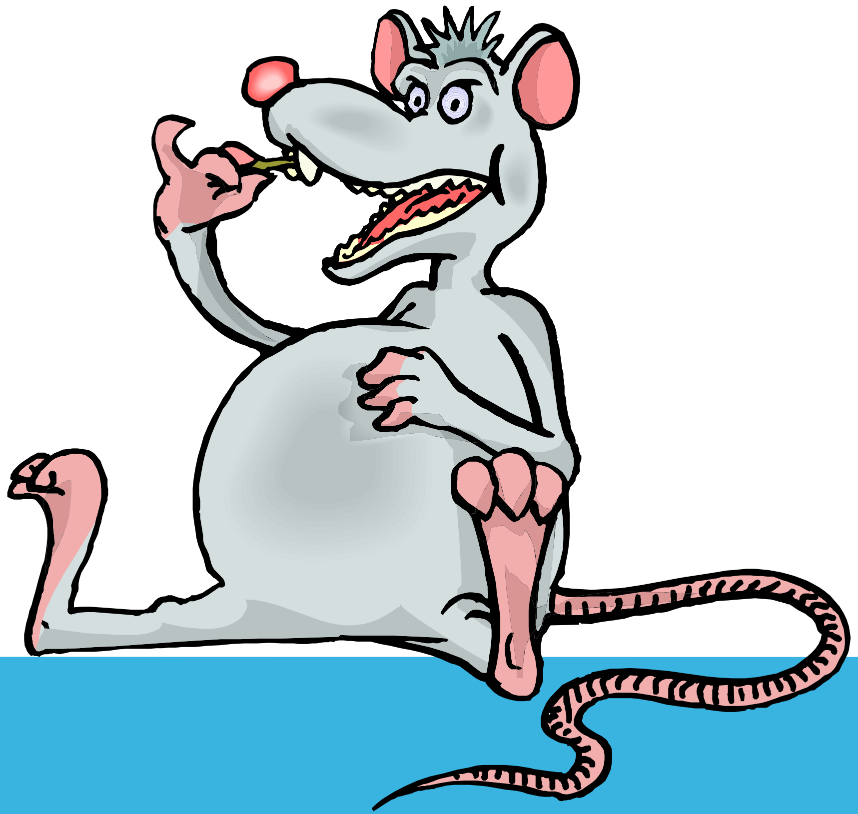
ATTRIBUTES OF A SUCCESSFUL VISIONARY APPROACH MAINTAINING BIO-SECURITY

- **Separation**
  - Facilities
  - Employees
  - Equipment
  - Species

ATTRIBUTES OF A SUCCESSFUL VISIONARY APPROACH MAINTAINING BIO-SECURITY

- **Layout Time**
  - Facilities
  - Equipment

- **Vectors**
  - Visitors
  - Pests
  - Birds from other farms



BIO-SECURITY-

Measures to start with

-Limit Tours

-Limit the introduction of another farm's flock

-Limit vectors

- -Rats
- -Starlings
- -Delivery personnel

BIO-SECURITY-
DON'T BE PART OF THE PROBLEM

- Blood test your birds
- Monitor your flock
- Have a vet inspect the flock once a month
- Supply health certificates as required
- Log visitors and deliveries

GENETICS

- ❑ **Specialization**
  - ❑ Meat
  - ❑ Flight
- ❑ **Feed conversion**
- ❑ **Egg production and fertility**
- ❑ **Disease Resistance**

GENETICS

- Gamebird breeders inherently breed for tamer birds
- Create ways to boost your flock's performance
- Open dialogue with state biologists

  -virtually all "wild" pheasants were introduced

GENETICS

- Plays a key role in public opinion of the industry
- The market wants “wild” birds

  - flying ability

  - fear of humans

  - ability to survive in the wild

GENETICS

- **Bird Appearance and Behavior**
- Size at maturity
- Length (and strength) of the tail
- Lack of aggressiveness towards other birds
- Age to maturity
- Coloration
- Lack of defects

ANIMAL RIGHTS

PETA

Humane Society of the United States

Goal is to outlaw hunting either through direct or indirect intervention

- Protests at hunting preserves
- Ballot Initiatives
- Making guns illegal

FEED PRICES

- Volatility
- Cost Per Bird

CONSULTANTS

- Bird Health
- Genetics
- Disease Control
- Nutrition
- Equipment

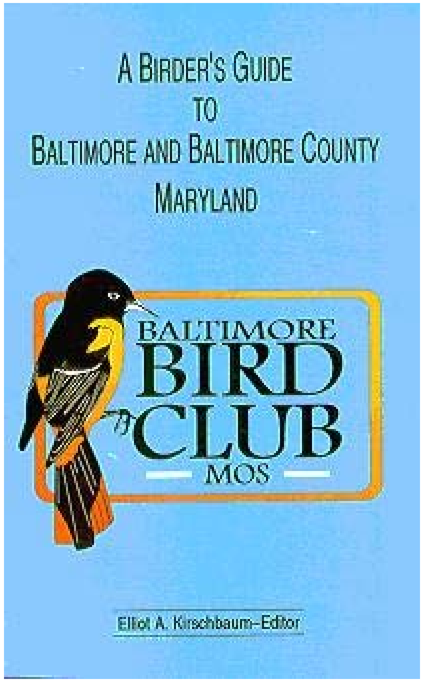
ORGANIZATIONS

- **NAGA**

  -North American Gamebird Association

- **State Game Bird Associations**

- **NRA, NSSF etc.**

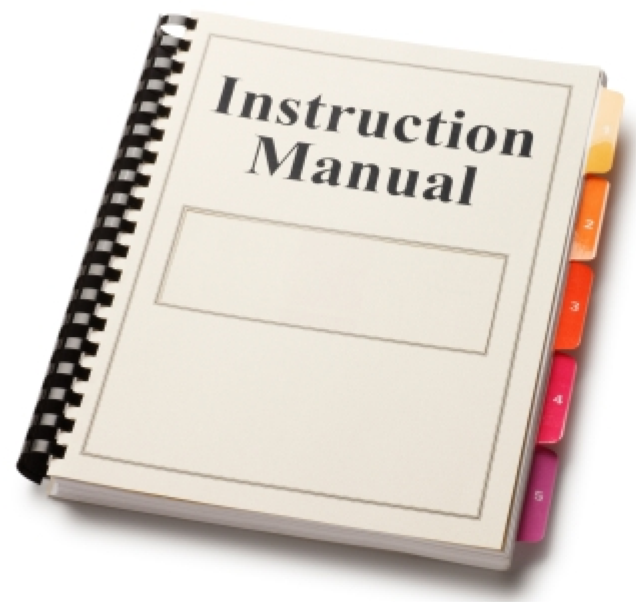


PROTOCOLS

- Why protocols are needed and important
- Develop
- Document
- Utilize

PROTOCOLS (THE MANUAL)

- Anything and everything should be covered
- Medications, feed, contact numbers, etc.
- Cover the who, what, when, where, and why for setup and procedures.

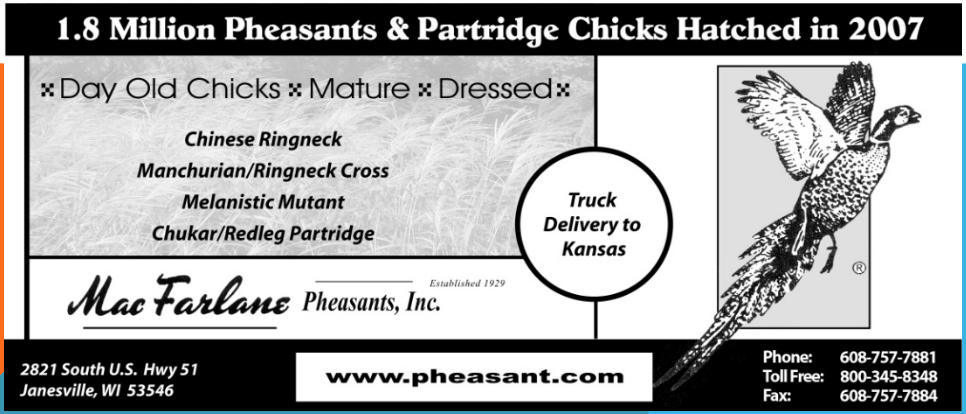


MARKETING

- Be able to communicate clearly to potential customers what makes your farm special
- Printed materials
- References
- Website and Social Media

MARKETING

- Active participation in the community
- Advertise on your vehicles
- Keep your business looking neat
- Back your product
- Sell quality goods
- Sell the health factor



MARKETING

- Sell quality not price
- Back your product
- Be professional
- Find out your strengths and promote them

SHIPPING

- Don't give Animal Rights group opportunity
- Use the proper vehicles
- U.S. Post Office and the airlines
- Bird Shippers of America

  -legislation
- Animal Welfare Act

Making good decisions purchasing inputs (equipment, feed, propane, labor)

- Thoroughly research what you will need before you contact suppliers
- Get more than one quote
- Be sure to ask about volume discounts and payment discounts
- Negotiate and contract your feed, propane and labor requirements before you set your season prices

PURCHASING EQUIPMENT

- **CHOOSING A VENDOR –**

- Research the vendor's reputation
- Call other people in the industry for references
- Find out who the vendor supports (they might support PETA)
- Has the vendor shown loyalty and ownership in the past?
- Has the vendor taken responsibility for their mistakes.
- Story of woodchips
- Does the vendor play an active role in the industry?

PROFITABILITY

- Involve yourself in the process to counteract attempts to change tax laws in certain states
- Join state and national organizations

-keep aware of what is going to affect you

-keep aware of what is affecting others

DRUG AVAILABILITY

- Profit returns for the pharmaceutical companies is small
- NAGA
- CVM
- Congress passed a minor species usage bill – (three criteria must be met):

Drug Availability

1) A licensed vet must prescribe the drug and the feed mill must have this prescription on file
2) The drug level utilized for the minor specie must be the same as the approved amount for the major specie
3) All withdrawal times and stipulations used in major species must be followed for the minor species

SUCCESSFUL DELEGATION

- Makes work easier.
- Improves efficiency.
- Increases employee effectiveness.
- Develops employees.
- Ensures that the right people do the right jobs.

DEVELOPMENT

- Running your farm lean
- Developing your employees
- Create an environment where employees can say what they are thinking

WORK ENVIRONMENT

- Create an attractive workplace environment
- What makes a workplace environment attractive?
- Low turnover
- Family oriented culture
- Clean organized workplace
- Website appearance

WHAT TYPE OF EMPLOYEE ARE YOU LOOKING FOR?

- Make a clear what type of employee you are looking for
- Willing to work
- Team work oriented

WHERE TO LOOK FOR EMPLOYEES

- Post ad on your webpage
- Advertise in your local paper
- Careerbuilder.com
- Post ad at area universities
- Agcareers.com
- Monster.com

HOW TO DETERMINE IF THE APPLICANT IS WHO YOU ARE LOOKING FOR

- Application
- Resume
- References
- Interview – punctuality, appearance
- Personality test
- Appearance of their car
- Eye contact
- Don't limit the number of times you interview
- Have more than one person interview the applicant

HIRING TIPS

- **Hire slow, fire fast**

- **If you know someone and you know soon they are not a good fit, cut the cord right away**

Be independent minded entrepreneurs

Work together through state and national organizations

GAME BIRD PRODUCTION

Conclusion

These are recommendations that should help lead you to being successful in the game bird industry. If you are willing to take the risk, hopefully you will reap the rewards.

Bill MacFarlane
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