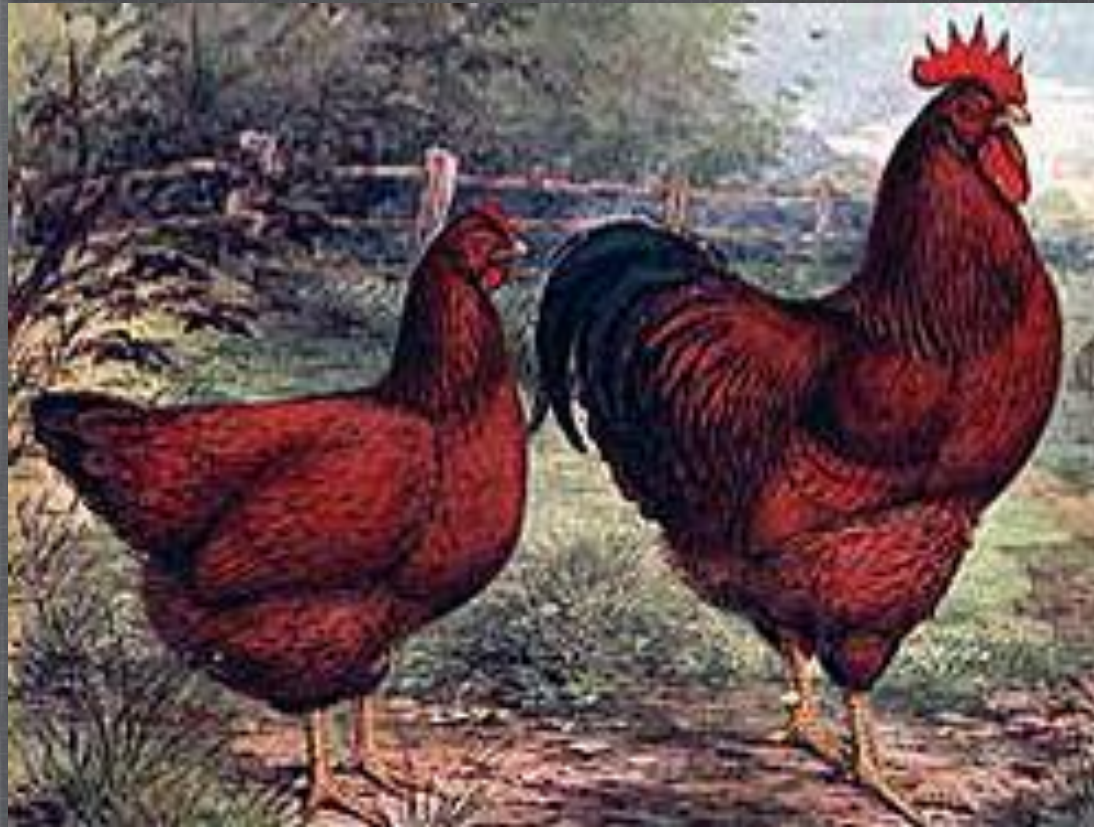


Raising poultry in Paradise

An overview of keeping chickens in the backyard



by Matt Stevenson and Glen Fukumoto
UH-CTAHR Cooperative Extension Service

Livestock Industries in Hawaii



Dairy (\$9.7 M)

\$47 Million*
Farm Gate Value



Pork (\$3.7 M)

Generating
\$141 Million
in Hawaii's Economy



Poultry (\$7.4 M)



Beef (\$26.2 M)

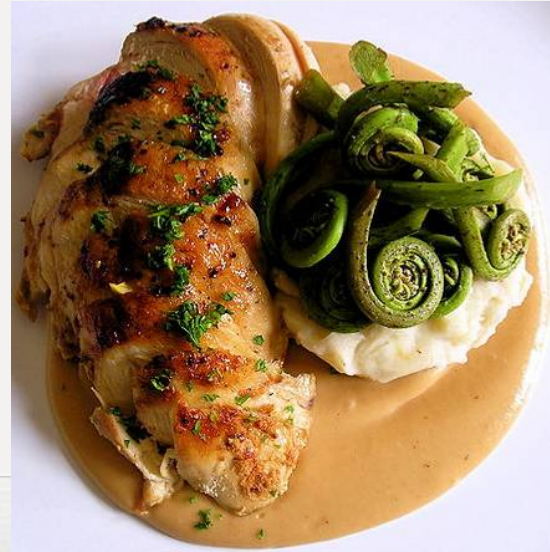
*HASS, 2007

Survey of Confined Operations 1999 to 2008

| 1999 | | 2008 | |
|---------------|--------------|--------------|-------|
| • Broiler | 5 | • 0 | ▼100% |
| • Dairy | 10 | • 2 | ▼80% |
| • Layer | 11 | • 5 | ▼55% |
| • Swine | 30 | • 21 ('04) | ▼30% |
| • Processors | 11 | • 9 | ▼18% |
| • Beef Cattle | 82,000 ('04) | 82,700 ('08) | |

Tasty, healthy Food

- Freshness is fundamental
- Eggs, nature's perfect food?
- Your food, your responsibility
- Less food miles



easy, low cost protein



- Little space required
- Low start-up and maintenance costs
- Not a huge time commitment
- Share the wealth

Small Scale Confinement

- Pros
 - Less labor
 - Small production area
 - Start-up costs lower ?
- Cons
 - Manure build-up, odors
 - Flies, other vectors



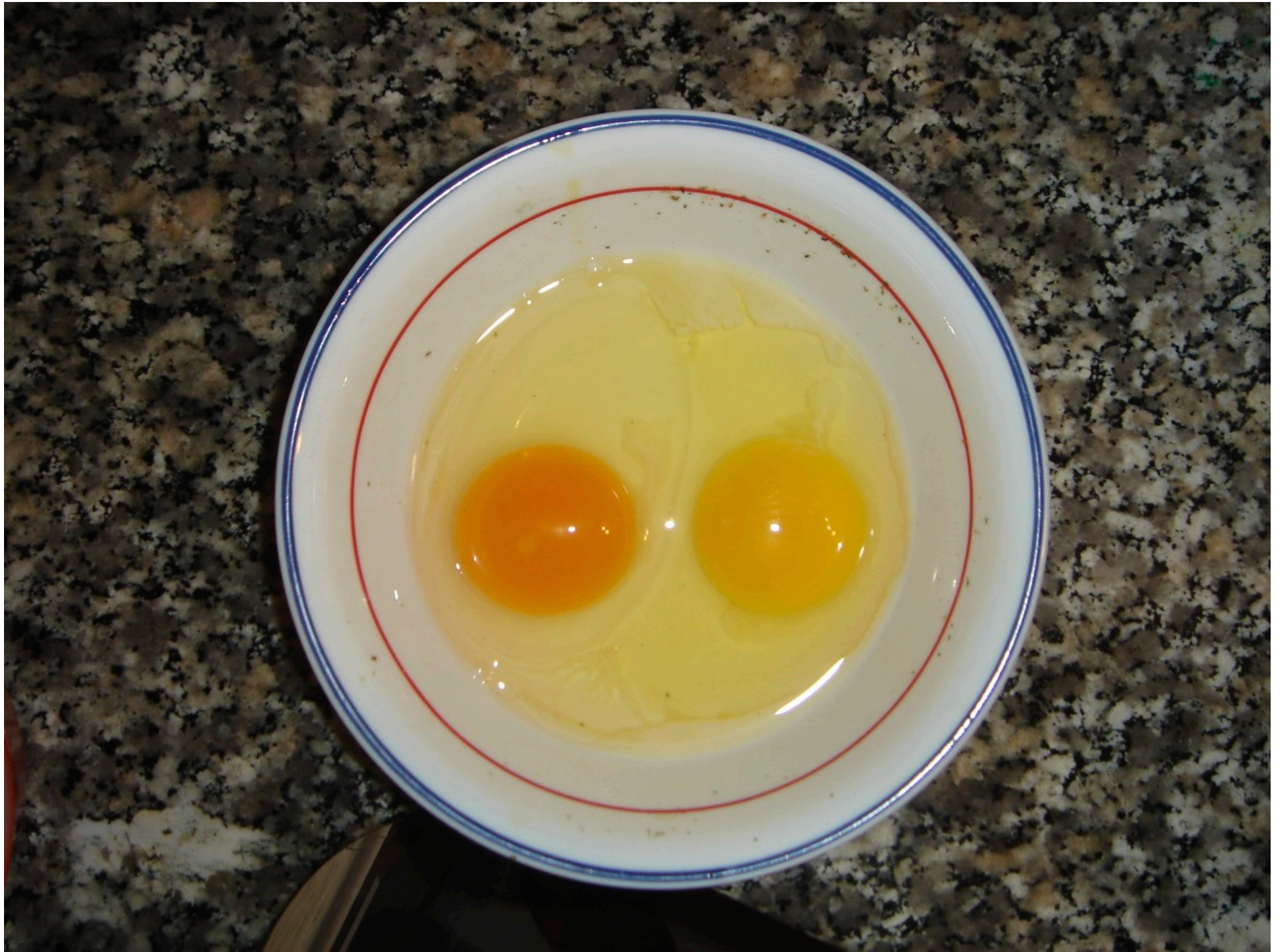
Pastured System

- Cons

- More labor
- Require “larger” area
- Environment/Forage considerations

- Pros

- No manure build-up. Direct nutrient application, stimulate nutrient cycling
- Enhance natural behaviors
- Supplemental feed through forage and insect ‘grazing’



Names of the Chicken



Chick



Cockerel



Rooster



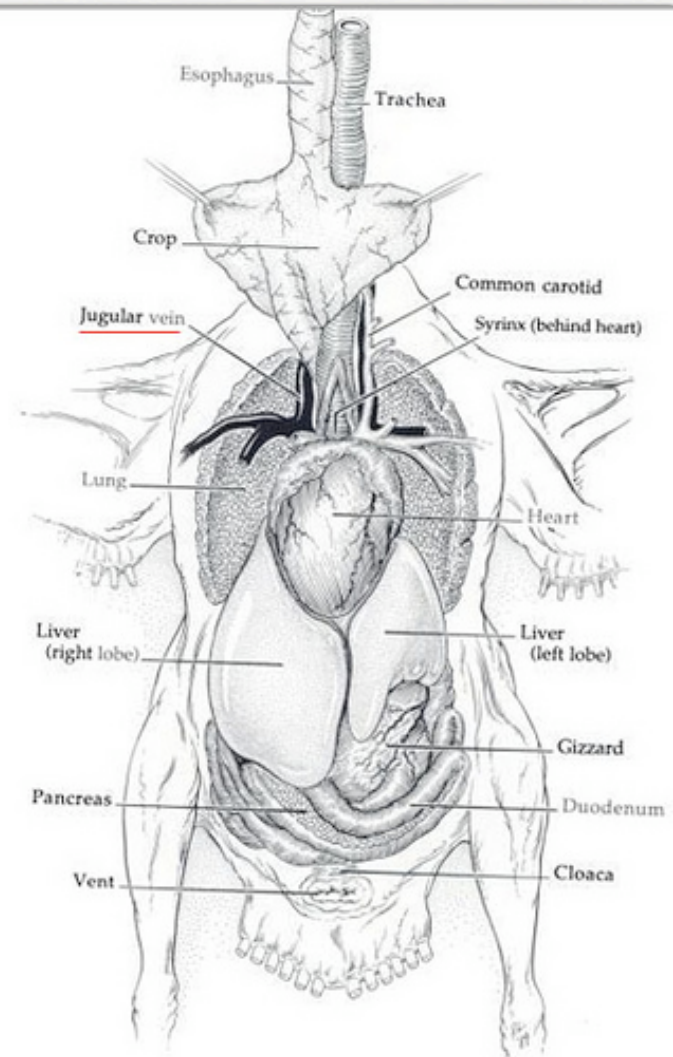
Pullet



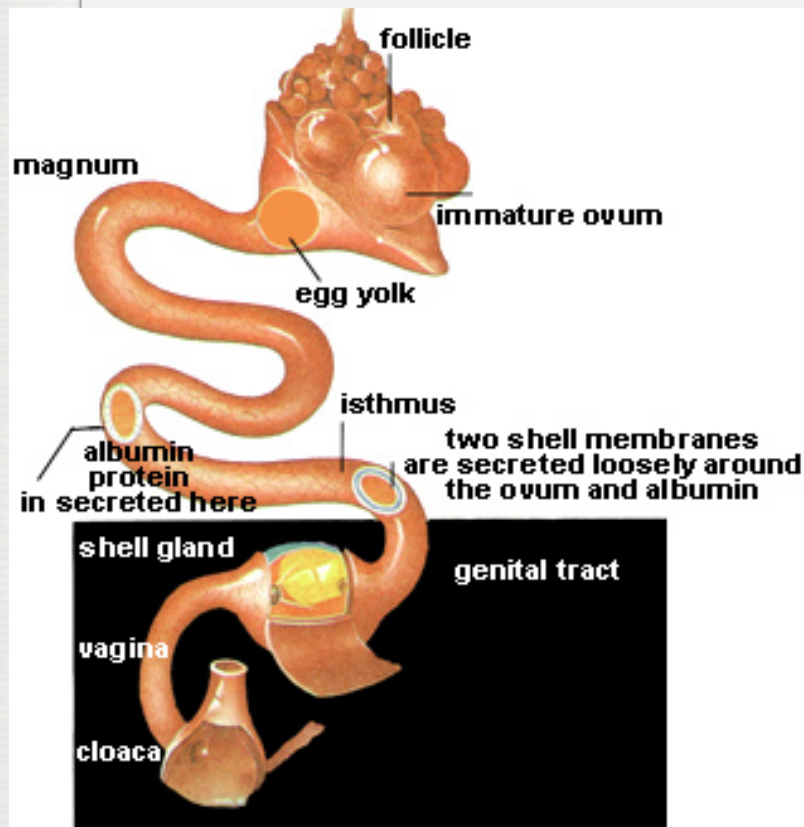
Hen

Physiology

- Chickens' vision and hearing are akin to humans
- Poor sense of smell
- No teeth, use crop store and gizzard to “chew” food
- All chickens have combs, and all but Silkie's have wattles



Physiology



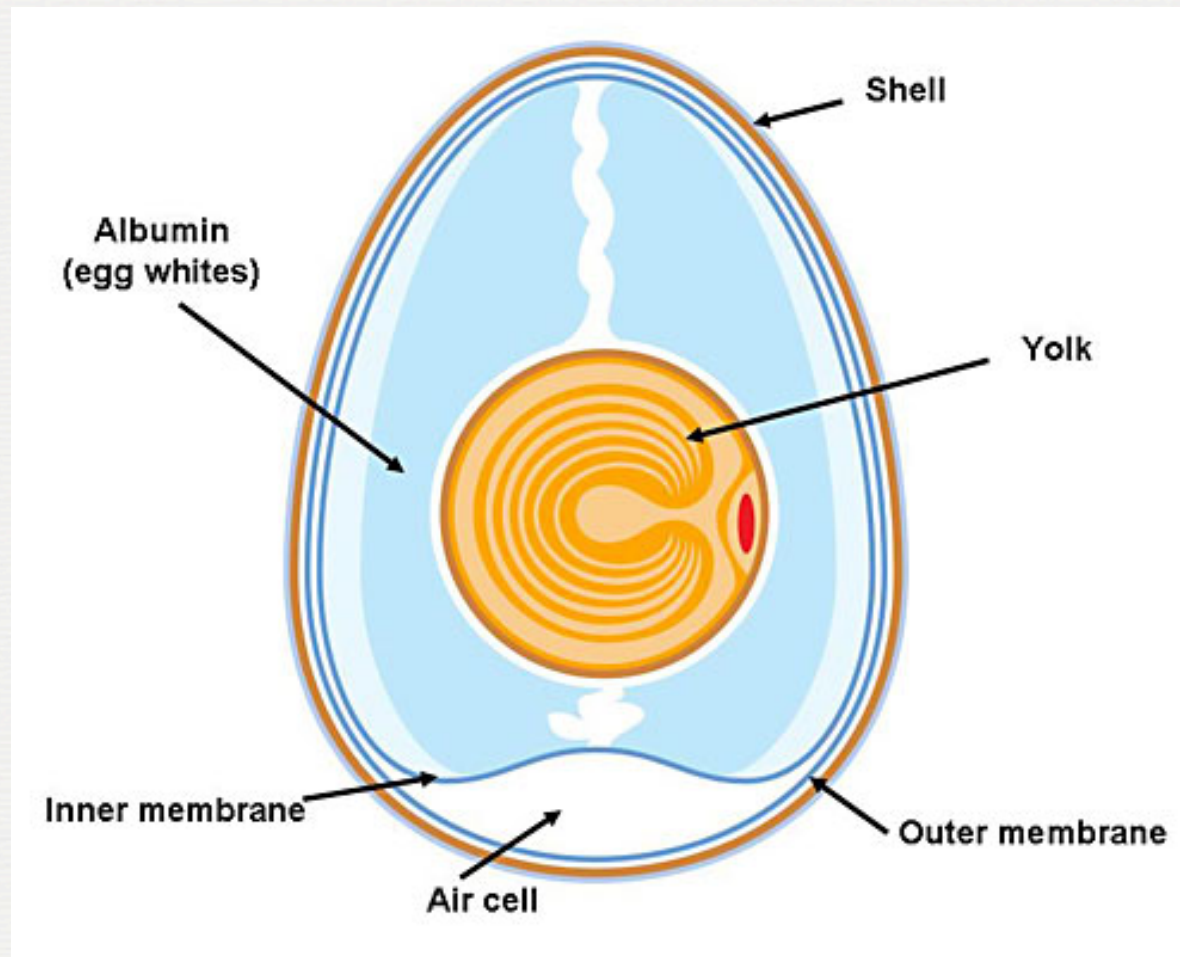
- Sexes differentiate around 3 and 8 weeks of age
- Pullets reach sexual maturity between 16 and 24 weeks
- Usually only 1 ovary matures which houses a clump of immature yokes
- Eggs are generally laid in the morning

Behavior

- Pecking Order: chicken hierarchy, develops by 5-7 weeks old in new chicks
- Change = Stress, Stress = Less Production
- Provide enough space and feed to avoid cannibalism
- Dust bathing
- Extremely intelligent with excellent memory



The egg



Egg Characteristics

- Contains all 22 essential amino acids, lacks only Vitamin C
- Second only to mother's milk in protein quality; FAO ranks eggs above dairy, fish, beef, and soybeans
- Most eggs weigh around 2 oz.; 10% is shell; 60% is white; 30% is yolk
- Egg shells can be green, brown, white, or speckled - color has no effect on nutritional quality

Egg characteristics

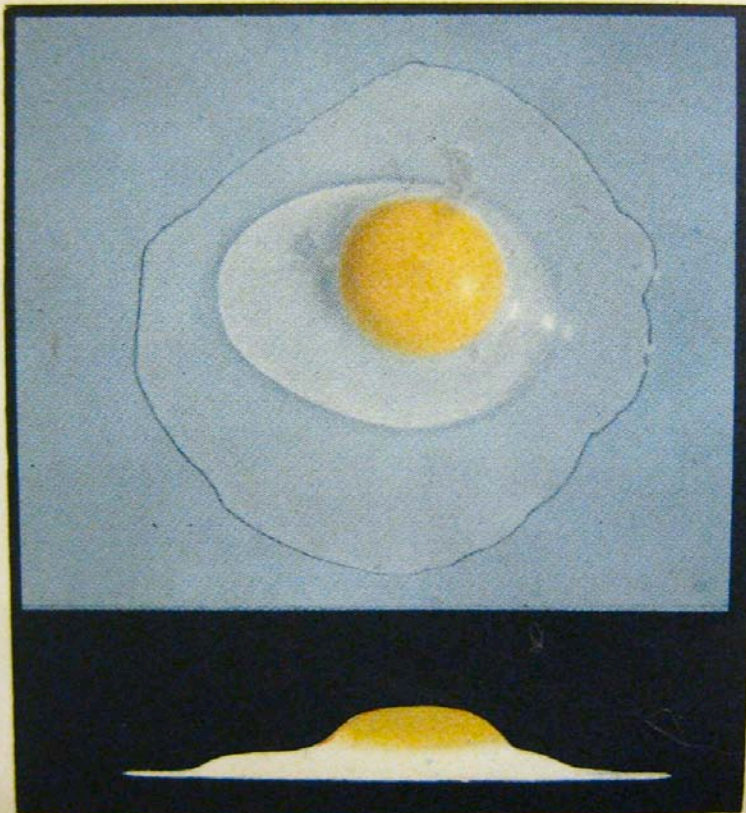
- Up to 10 times higher Omega-3 fatty acids from pastured hens - higher levels reduce risk for a suite of diseases
- 60% more vitamin B12; 50% more folic acid
- 34% less cholesterol in pasture based eggs
- Effects of fats and cholesterol dependent on who is eating them

Egg quality

- Eggs are clean when laid, clean nest box = clean eggs
- The cuticle or “bloom” is removed with mechanical washing and may shorten shelf life
- Albumen has major influence on internal quality
- As the hen ages, albumen quality decreases
- Blood spots in eggs are normal and edible

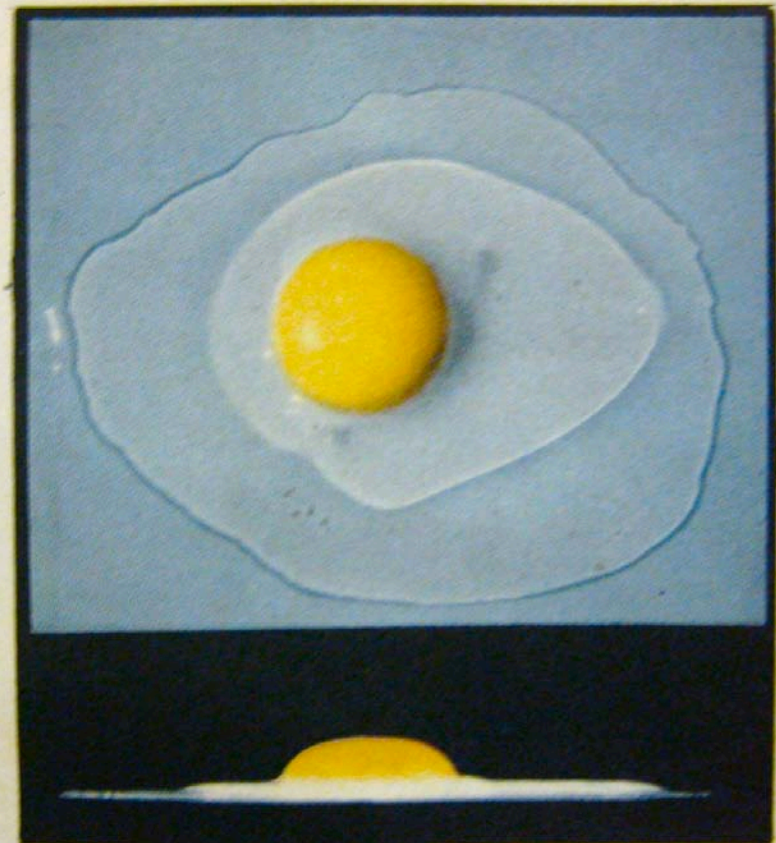
Egg quality

AA Quality



Egg covers small area; much thick white surrounds yolk, has small amount of thin white; yolk round and upstanding.

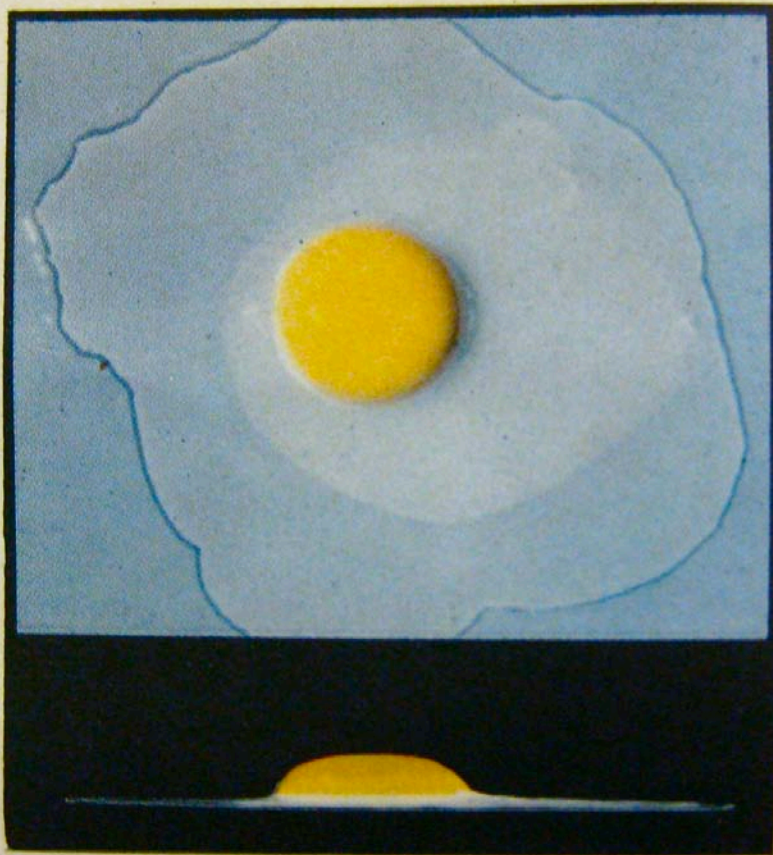
A Quality



Egg covers moderate area; has considerable thick white; medium amount of thin white; yolk round and upstanding.

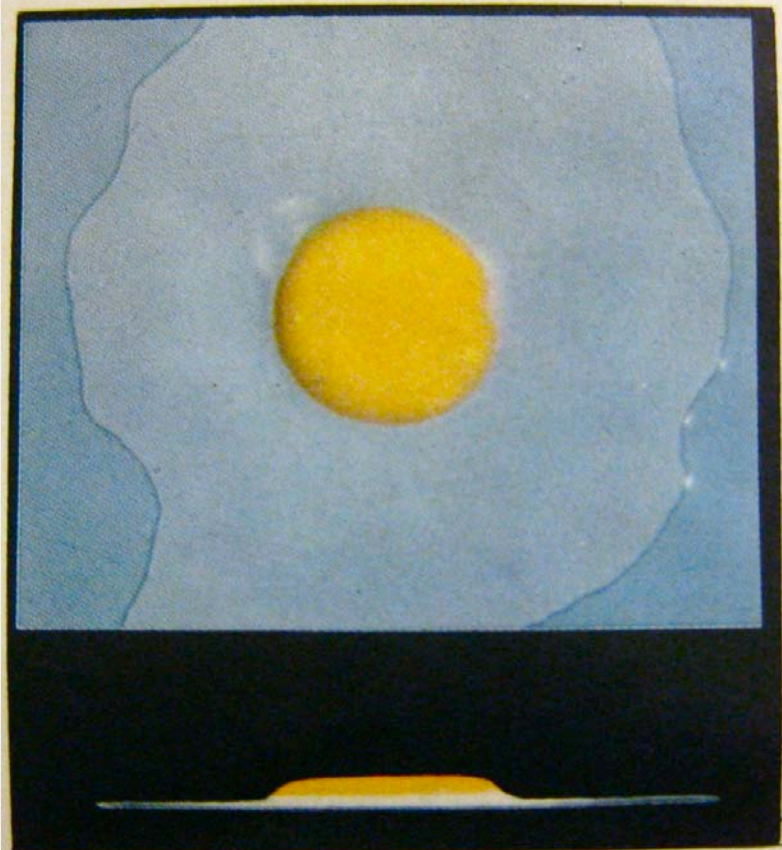
Egg quality

B Quality



Egg covers wide area; has small amount of thick white; much thin white; yolk somewhat flattened and enlarged.

C Quality



Egg covers very wide area; has no thick white; large amount of thin white thinly spread; yolk very flat and enlarged.

Breeds



Layers

- Leghorn
- Ameraucana
- Araucana
- Andalusian



Meat

- Cornish cross
- Wyandotte
- Cochin
- Shamo

Breeds



Rhode Is. Red



Plymouth Rock



Australorp



Araucana



New Hampshire

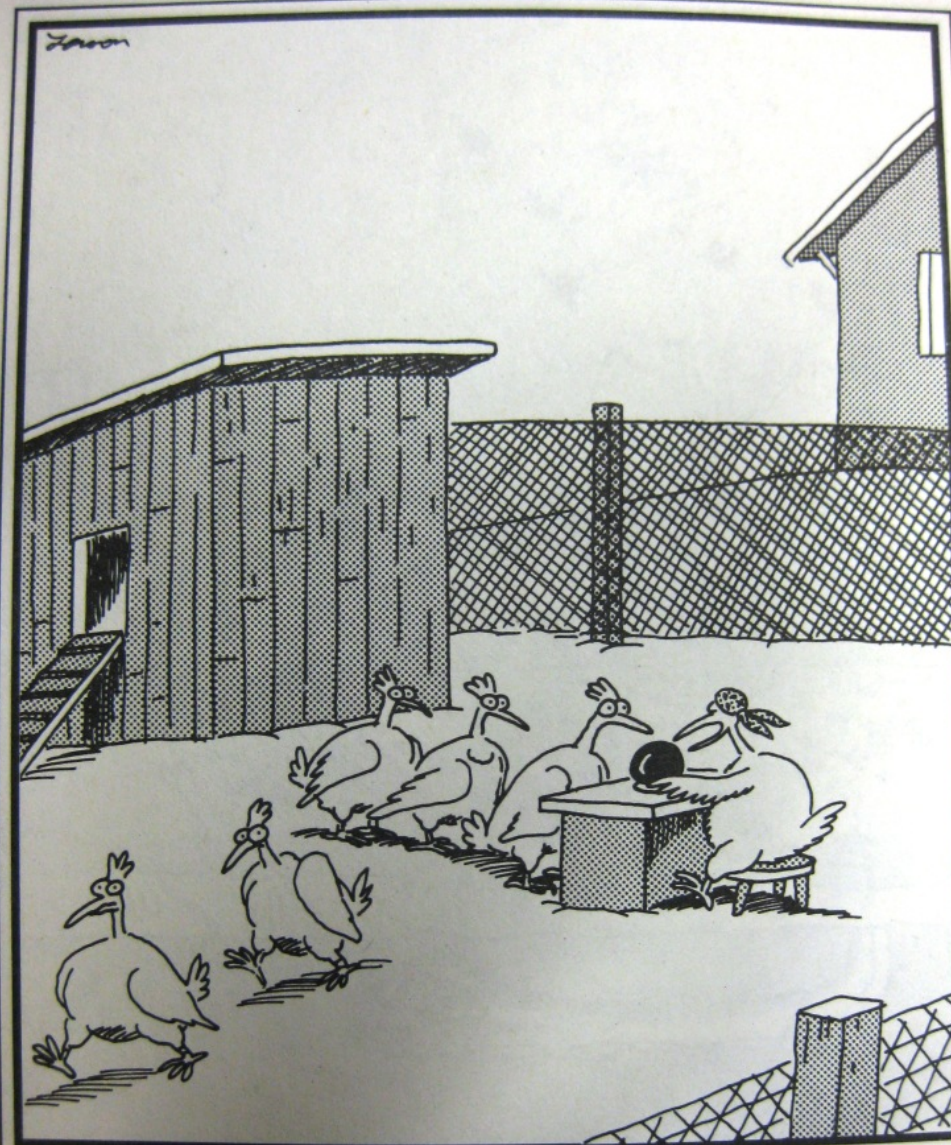


Buff Orpington

Meat birds

- Called broilers & fryers
- Mature in 6-12 weeks
- Pasture raised birds take longer to mature
- Flavor and health benefits similar to pastured eggs
- Simple to process, no specialized equipment





"Whoa! Another bad one! ... I see your severed head lying quietly in the red-stained dirt, a surprised expression still frozen in your lifeless eyes. ... Next."

Processing

- 6-8 hour fasting period
- Immobilize - cone or line
- Cut jugular (not windpipe) and drain blood completely
- Immerse in 125F water for 30 to 75 seconds
- Pick feathers immediately using rubbing action



Processing

- Remove head, neck, shanks, and oil gland
- Eviscerate
- Rinse clean thoroughly
- Submerge in ice water to 40F before packing (~2hrs)
- Drain completely before bagging and storing

Basic Nutrition



- Water
- Energy
- Protein (Lysine, Methionine)
- Calcium, Phosphorus

Daily Nutrient Requirements of Chickens*

:

| Type | CP (g) | Energy (kcal/kg) | Lysine (g) | Methion. (g) | Calcium (g) | Phosph. (g) |
|---------------------------------|---------------|-----------------------------|-------------------|-------------------------|------------------------|------------------------|
| Layer Chicks 0 wks - 1st egg | 1.7 - 16.5 | 2800 - 2850 | 0.05 - 0.76 | 0.02 - 0.33 | 0.18 - 3.6 | 0.04 - 0.28 |
| Broilers 0 - 9 wks | 4.4 - 40.5 | 3200 | 0.2 - 1.9 | 0.1 - 0.72 | 0.19 - 1.8 | 0.09 - 0.68 |
| Laying Hens | 16.5 | 2900 | 0.76 | 0.33 | 3.6 | 0.28 |

*From National Research Council, 1994

Temperate Feedstuffs

- Energy Grains (corn, sorghum, other grains)
- Protein grains (soybeans)
- Forages (alfalfa)

Tropical Feedstuffs

- Energy (cassava, taro, breadfruit, sweet potato, yam, coconut, banana, macadamia)
- Protein (pigeon peas)
- Forages (clovers, perennial peanut, leafy perennials)

Other Potential Feedstuffs

- Food wastes (bakery products, wheat mill run)
- Protein (meat and bone meal)
- Other crop industries (vegetable, papaya)

Forage Production and Alternative Feeds

- Alternative Feeds
 - Perennial peanut
 - Stoloniferous grasses, legumes
 - Cull fruits and vegetables
 - Leafy perennials
 - Other: pigeon peas, sorghum



Estimating Forage Production



Optimum Levels in Rations of Selected Ingredients*

| Feedstuff | Optimum Level (%) |
|---------------------|--------------------------|
| Citrus pulp | 5 - 10 |
| Coconut meal/cake | 5 - 15 |
| Coffee grounds | 3-5 |
| Leucaena leaf | 2 - 5 |
| Palm kernel meal | 10 - 40 |
| Palm oil | 2 - 8 |
| Sugar cane molasses | 10 - 30 |

*Adapted from Hutagalung, 1981 in Sonaiya and Swan, 2004

“All-Hawaiian Emergency Ration*”

| Feedstuff | Ration 1 (%) | Ration 2 (%) |
|-----------------------|---------------------|---------------------|
| Fish meal | 15 | - |
| Meat scraps | - | 17 |
| Sorghum (milo) | 55 | - |
| Corn | - | 54 |
| Pigeonpea meal | 7 | - |
| Soybean oil meal | - | 3 |
| Peanut oil meal | - | 3 |
| Kiawe bean meal | 15 | - |
| Pineapple bran (fine) | - | 15 |
| Koa haole seed meal | 5 | 5 |
| Salt | 1 | 1 |
| Coral sand | 2 | 2 |
| Total | 100 | 100 |

*Adapted from Bice, 1947 - “The birds on the above ration averaged 55% production over the duration of the experiment which lasted for a period of 6 months” (pg 17).

Rotational Grazing Management

- Provides fresh green forage, replacing a portion of imported feed grains.
- Forage cover crop reduces erosion, enhance water percolation and water holding capacity
- Grazing rotation increases plant recovery periods, improving plant vigor.
- Improves plant communities and reduces weed competition.

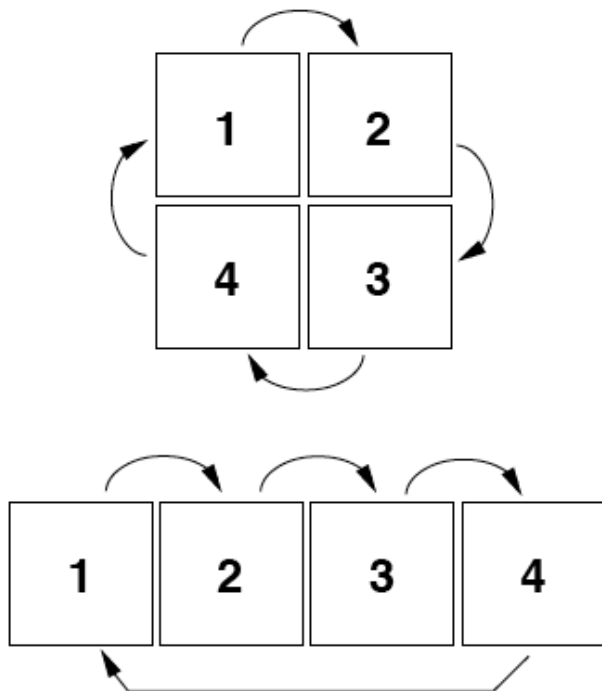
Rotational Grazing Management

- Improves nutrient cycle of the area, improves water cycling and build soil organic matter for improved forage plant growth.
- Reduce environmental concerns of manure build-up, odors, nuisance vectors.
- Pathogens reduced through solar disinfection.
- Animals become docile through frequent interaction with people.
- Animals are controlled in a well managed system

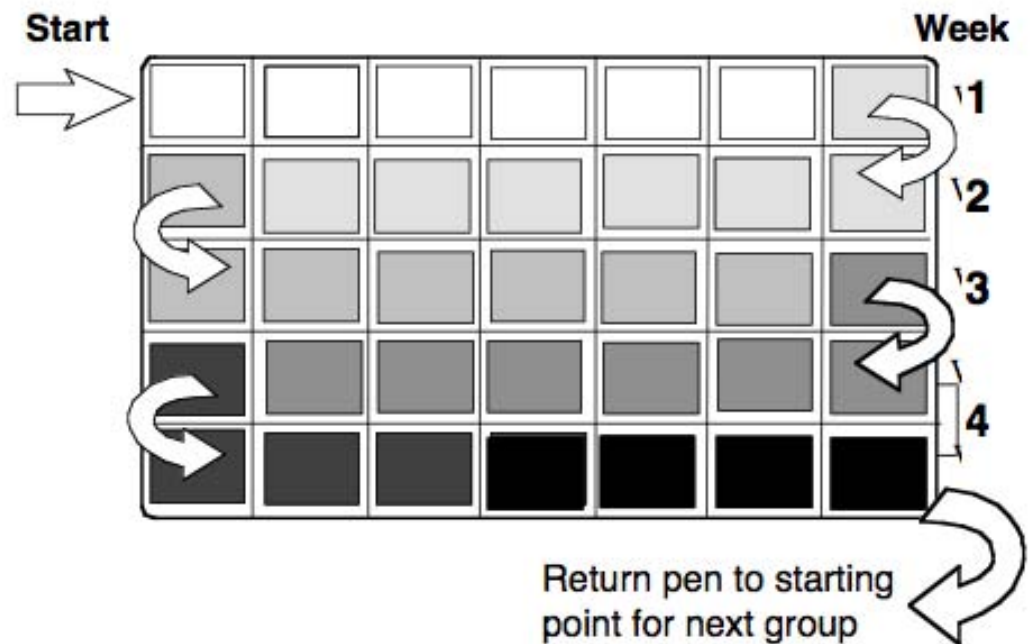
Examples of Grazing Rotations



4-cycle rotation



28-cycle rotation





0-d rest

5-d rest

12-d rest











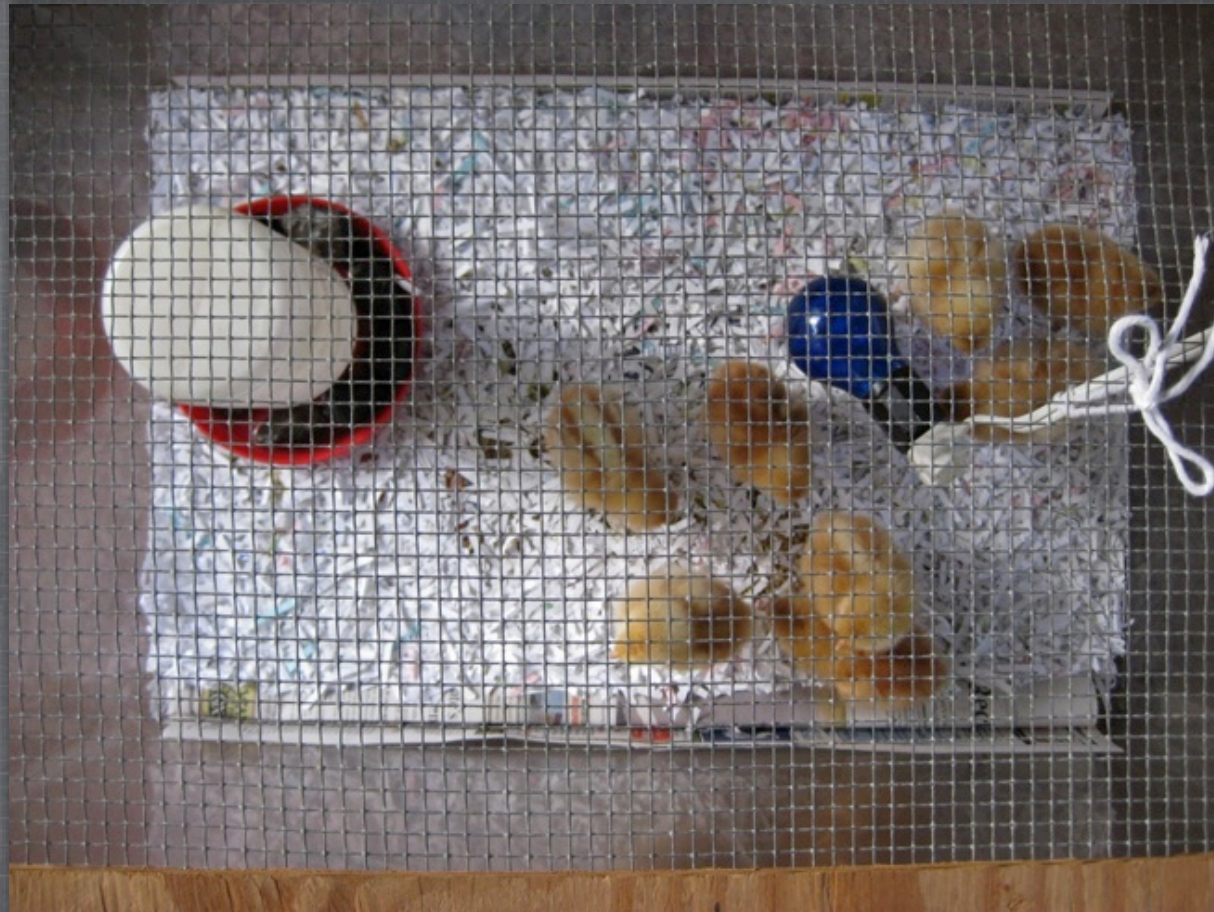






From chick to molt

Overview of laying systems



Picking up chicks

- Cardboard box with bedding and space at 0-4 weeks: 0.5 ft² / bird
- Food, Water, Heat, Protection
- Need to keep day old chicks warm: 90-95F
- Avoid hard surfaces



Transition



- Medicated or Non-medicated feed?
- 4-8 weeks: 1ft²/bird
- ~6 weeks switch to lower %CP ration
- 8-12 weeks move to pasture & lay ration

She's got eggs

- First, small eggs laid between 16-24 weeks of age
- Will lay for about 12-18 months before “molting”
- Rate of lay will be about 65-85% of lay before molt
- Purchase or hatch replacements 4-6 months before molt



in the end...



One last test...

