History of the Domestic Chicken

- Red Jungle Fowl
  - *Gallus gallus*

- Found in:
  - India
  - Burma
  - Malaysia
  - Thailand
  - Cambodia

- Domesticated over 8000 years ago
History of the Domestic Chicken

• Much smaller than today’s domestic varieties.
• Tropical species:
  – Adapted to live in warm & humid conditions.
• Originally adapted for religious and entertainment purposes.
• Romans developed the chicken for agricultural purposes.
  – Most of this knowledge died with the empire.
History of the Domestic Chicken

• Poultry for agricultural purposes did not resume until the 19th century in Europe.
• Over the past 200 years, more than 300 breeds of chicken have been developed.
• Modern breeds are derived from the Asiatic breed and the Mediterranean breed.
• Today: typically hybrids bred for meat production or egg production.
Egg Laying Types

• Divided into light and medium hybrids:
  – Light
    • Derived from the White Leghorn
    • White eggs
    • ~ 3.3 lbs.
  – Medium
    • Derived from Rhode Island Red
    • Brown eggs
    • ~4.4 lbs.
Meat Production Types

• Most are crosses between Cornish and White Plymouth Rock (Cornish-Rock).
• Bred for fast and large muscle production.
• Bred with white feathers (why?)
• Bred for yellow or white skin (why?)
  – Also influenced by diet.
Sex Determination in Offspring

• Mammals
  – Male = XY, Female = XX; male determines the sex

• Birds (including all poultry)
  – Male = ZZ, Female = ZW; female determines sex

• Equal chance that the offspring will be male or female.
  – Incubation temperature does not affect this.
Simple Gene Inheritance

• Only one pair of genes is involved.
  – Simple dominance or recessive.
• Examples in chickens:
  – Comb type
  – Plumage color
  – Skin Color
Multiple Gene Inheritance

- Most traits are influenced by multiple genes.
- You will see gradation of expression.
- This is why there are large companies that are devoted to only breeding stock for commercial production.
Pedigree Farm

Great Grandparent Flock

Grandparent Flock

Multiplier (Parent) Flock

Production Farm
## Dominant & Recessive Characters in Chickens

<table>
<thead>
<tr>
<th>Character</th>
<th>Dominant or Recessive</th>
<th>Sex-Linked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barred Plumage</td>
<td>Plymouth Rocks, dominant to nonbarring</td>
<td>Yes</td>
</tr>
<tr>
<td>Black Plumage</td>
<td>Dominant to recessive white</td>
<td></td>
</tr>
<tr>
<td>Broodiness</td>
<td>Dominant to nonbroodiness</td>
<td>Yes</td>
</tr>
<tr>
<td>Buff Plumage</td>
<td>Dominant to recessive white</td>
<td></td>
</tr>
<tr>
<td>Close Feathering</td>
<td>Dominant to loose feathering</td>
<td></td>
</tr>
<tr>
<td>Early Sexual Maturity</td>
<td>Dominant to late sexual maturity</td>
<td>Yes</td>
</tr>
<tr>
<td>Feathered Shanks</td>
<td>Dominant to nonfeathered shanks</td>
<td></td>
</tr>
</tbody>
</table>
## Dominant & Recessive Characters in Chickens

<table>
<thead>
<tr>
<th>Character</th>
<th>Dominant or Recessive</th>
<th>Sex-Linked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rose Comb</td>
<td>Dominant to single comb</td>
<td></td>
</tr>
<tr>
<td>Side Sprigs</td>
<td>Dominant to normal comb</td>
<td></td>
</tr>
<tr>
<td>Silver Plumage</td>
<td>Dominant to gold plumage</td>
<td>Yes</td>
</tr>
<tr>
<td>Slow Feathering</td>
<td>Dominant to rapid feathering</td>
<td>Yes</td>
</tr>
<tr>
<td>White Plumage</td>
<td>White Leghorns – dominant to color Wyandottes – recessive to color</td>
<td></td>
</tr>
<tr>
<td>White Skin &amp; Shank Color</td>
<td>Dominant to yellow skin &amp; shank color</td>
<td></td>
</tr>
<tr>
<td>Winter Pause</td>
<td>Dominant to continuous laying</td>
<td></td>
</tr>
</tbody>
</table>
Feather Sexing

- Sex-linked trait
- Male parent must be recessive early feathering.
- Female parent must be dominant late feathering.
- Male offspring will be late feathering.
- Female offspring will be early feathering.

Fig. 4-6. Sex-linked feather (wing) sexing by the primary and covert feathers, viewing the outstretched wing from the top. Note that the coverts emerge from the top surface of the wing, whereas the primaries emerge from the lower edge of the wing. Note, too, that the relative length of the primaries and coverts is more important than the overall length of the feathers, since overall length depends upon the length of time that the chick has been out of the shell. This type of sex identification is increasing in broiler chicks because it makes it possible to separate the more rapidly growing broiler cockerels from their slower growing sisters.
Heterosis (Hybrid Vigor)

• Cross-breeds typically outperform or outproduce the average of the parent purebreeds.

• Not always true.
  – SCWL are equal in egg laying prowess as hybrids.
Hybrid or Heritage

**Hybrid**
- Sex-linked
- Cornish-Rock
- Leghorns
- Rhode Island Red

**Heritage**
- Wyandotte
- Buff Orpington
- Barred Rock

All breeds considered heritage must have been in existence pre-WWII.
Selecting a breed based on egg color
WHITE EGG LAYERS

What do they have in common?

White ear lobes
BROWN EGG LAYERS

What do they have in common?

Red earlobes
AMERAUCANAS *versus* ARAUCANA

**Ameraucanas:** Beard and tail

**Araucanas:** No beard. Tuffs, no tail
## Selecting a breed by Egg Color

<table>
<thead>
<tr>
<th>White Eggs</th>
<th>Brown Eggs</th>
<th>Blue/Green Eggs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leghorns</td>
<td>Rhode Island Red</td>
<td>Araucana</td>
</tr>
<tr>
<td>Buttercup</td>
<td>Rhode Island White</td>
<td>Ameraucana</td>
</tr>
<tr>
<td>Anocona</td>
<td>Buff Orpington</td>
<td></td>
</tr>
<tr>
<td>Andalusian</td>
<td>Plymouth Rocks</td>
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</tr>
<tr>
<td>Hamburgs</td>
<td>Delaware</td>
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</tr>
<tr>
<td></td>
<td>Dominique</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wyandottes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Red Sex Links</td>
<td></td>
</tr>
</tbody>
</table>

Source: