UF/IFAS Extension
The Journey to Sustainability Begins with Education
CHICKENS 101
INTRODUCTORY COURSE

NUTRITION

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  UF/IFAS Extension Sarasota County
A Starting Point is to Learn How do Poultry Eat?

Known as a modified monogastric system
Chicken Digestion Parts and Functions

- **Mouth/Beak** - gather and break down feed (no teeth)
- **Esophagus** - tube from mouth to stomach that is open at the mouth end
- **Crop** - feed storage and moistening
- **Proventriculus** - glandular stomach (HCl and gastric juices); enzymatic
- **Gizzard** - muscular stomach; mechanical breakdown; grit particles are essential
Chicken Digestion Parts and Functions

• **Small Intestine** - enzymatic digestion and absorption
  - Functions of the small intestine: digestion of proteins, carbohydrates, and fats; absorption of the end products of digestion
  - Enzymes in the small intestine

• **Ceca** - site of beneficial digestive microbes

• **Large Intestine**
  - bacterial activity
  - water absorption
  - waste storage

• **Cloaca** - common chamber for GI and urinary tracts

• **Vent** - common exit for GI and urinary tracts
THE BASICS: NUTRITION

What do Poultry Need??

- Water............. For temperature regulation & digestion
- Protein........... 11 of 20 amino acids
- Carbohydrates
- Fat............... 1 fatty acid
- Vitamins......... 13
- Minerals......... 27 known

Seventy percent of the cost of raising chickens goes for feed. This is an investment rather than an expense because the better the birds are fed, the more productive they will be.

http://www.caes.uga.edu/Publications/pubDetail.cfm?pk_id=6885&pg=np&ct=poultry&kt=&kid=&pid=#Fee
Nutritional requirements to provide a balance diet depend on:

- Maintenance
- Growth
- Production
- Health of the birds
Use the right feed

Do not feed layer feeds to broilers.

Do not feed finely ground feed.

Most commercial feeds are designed to meet all of the bird’s requirements when fed as a sole source of nutrition.
### Layer Nutrition Example

<table>
<thead>
<tr>
<th>Stage (weeks)</th>
<th>% Crude protein required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter 1-6</td>
<td>20-23%</td>
</tr>
<tr>
<td>Pullets 6-14</td>
<td>15-19%</td>
</tr>
<tr>
<td>Pullets 14-22</td>
<td>12%</td>
</tr>
<tr>
<td>Layer/Breeder Hens</td>
<td>16%</td>
</tr>
</tbody>
</table>
Commercial Feeds

Nutritionists for the commercial poultry industry have developed formulations for complete nutrition of chickens according to growth stage.

Complete feeding diets need no additional supplements and may be purchased as mash, crumbles, or pellets. Avoid powdery feeds.

Calcium (e.g., crushed oyster shell) and hard, insoluble granite grit should be provide as supplemental feed on demand.

Do not mix scratch grain with a complete commercial ration. Cracked corn, for example, is low in protein. By mixing cracked corn with a complete commercial grower ration, you dilute (reduce) the protein level as well as the vitamin and mineral
Feed Additives (Optional)

- Antioxidant: Prevents rancidity of the fat in the diet or to prevent nutrient loss.
- Pellet binders: Used to improve texture and firmness of pelleted feeds.
- Hormones are not added to any poultry feeds.
- Coccidiostats: To prevent coccidia problems with young chickens. Mature chickens develop a resistance to coccidiosis if allowed to contract a mild infection of the disease. The medicated feed is then replaced with a nonmedicated feed.
- Antibiotics: To stimulate growth rate and feed efficiency of young chickens.

Follow feeding directions and withdrawal times for feeds with coccidiostats and antibiotics.
**THE BASICS: NUTRITION**

+ Store feed in container with a tight-fitting lid & a cool, dry place. Never feed moldy feed.
+ Limit purchases to a 2-3 week supply.
+ Keep feed and cool, clean water available to birds at all times.
+ Ration-feeding of diets can result in reduced growth, egg production and eggshell strength.
+ Fill feeders at \( \frac{3}{4} \) capacity to avoid excessive waste.
What Inhibits Water & Feed Intake?

- Inadequate Water
- Stale or rancid feed
- Mold
- Disease
- Heat
Feeders

• Hanging System
  • Raise and lower to bird height
  • Outer lip level with birds back
  • Prevents spillage and spoilage

• Trough Feeder Systems
  • Chickens more susceptible to disease
  • Taken out of pen before moving
  • More chickens can feed at once
Watering Systems

- Five-gallon bucket atop the pen will gravity feed a bell type
- Mesh screen across top
- Attach to pen
- Hoses are used on nipple type
- Daily water consumption at 90° F for chickens…. approx. 0.5 pint/bird
- Water intake can vary greatly
Alternative Feed Ingredients

Amaranth
Buckwheat
Canola meal
Earthworms
Oats
Potato protein
Quinoa
Rice bran
Rye
Seaweed

http://www.extension.org/poultry
# Acceptable Kitchen Scraps & Foods Examples

<table>
<thead>
<tr>
<th>Food</th>
<th>Type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>Raw &amp; applesauce</td>
<td>Apple seeds contain cyanide, but not in sufficient quantities to kill.</td>
</tr>
<tr>
<td>Asparagus</td>
<td>Raw &amp; cooked</td>
<td>Okay to feed, but not a favorite.</td>
</tr>
<tr>
<td>Bananas</td>
<td>Without peel</td>
<td>High in potassium, a good treat.</td>
</tr>
<tr>
<td>Beans</td>
<td>Well cooked only</td>
<td>Also greenbeans</td>
</tr>
<tr>
<td>Berries</td>
<td>All kinds</td>
<td>A treat, especially strawberries.</td>
</tr>
<tr>
<td>Broccoli &amp; Cauliflower</td>
<td></td>
<td>Tuck into a suet cage and they will pick at it all day.</td>
</tr>
<tr>
<td>Carrots</td>
<td>Raw &amp; cooked</td>
<td>They like carrot foliage too.</td>
</tr>
</tbody>
</table>
### Don’t Feed the Following Kitchen Scraps & Foods

<table>
<thead>
<tr>
<th>Food</th>
<th>Reason Why</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw green potato peels</td>
<td>Toxic substance called Solanine.</td>
</tr>
<tr>
<td>Anything real salty</td>
<td>Can cause salt poisoning in small bodies such as chickens.</td>
</tr>
<tr>
<td>Citrus</td>
<td></td>
</tr>
<tr>
<td>Dried or undercooked beans</td>
<td>Raw, or dry beans, contain a poison called hemaglutin which is toxic to birds.</td>
</tr>
<tr>
<td>Avocado skin &amp; pit</td>
<td>Skin and pit have low levels of toxicity.</td>
</tr>
<tr>
<td>Raw eggs</td>
<td>You don’t want to introduce your chickens to the tastiness of eggs which may be waiting to be collected in the nestboxes.</td>
</tr>
<tr>
<td>Candy, chocolate, sugar</td>
<td>Their teeth will rot?!… No, it’s just bad for their systems, and chocolate can be poisonous to most pets.</td>
</tr>
</tbody>
</table>

http://www.backyardchickens.com/
THE BASICS: NUTRITION

- grub larvae composter & grower
- Use grub larvae as food high in fats & protein

Black Soldier Fly

Grub larvae

Adult
Chickens that can go outdoors can supplement their diet with greens and insects.

It will not take them long to devour the forage within their enclosure.

If free ranging is used to supplemental the diet then do not use chemical pesticides in foraging area.
THE BASICS: BENEFITS OF BACKYARD CHICKENS & FORAGE FEEDING

• Eggs from pasture-raised compared to commercial, confinement industry hens have the following:

  • 1/3 less cholesterol
  • 1/4 less saturated fat
  • 2/3 more vitamin A
  • 2 times more omega-3 fatty acids
  • 3 times more vitamin E
  • 7 times more beta carotene

1 http://www.motherearthnews.com/eggs.aspx
Foraging Feeding

- Caeca develop microbes with the capacity to digest fiber and eat backyard forage
- Poultry are not ruminants and cannot digest cellulose in most plants very efficiently.
- Chickens will eat almost anything as long as it is not too tall or not too tough.
Managing Backyards for Forage

- Keep the yard vegetation young and productive.
- Poultry coops should be laid out so it is easy to move pens.
- Oats, clovers mixed with grasses are most palatable.
- But be cautious – some seed blends are not adapted to our area.
Growth curves for cool-season perennial grasses, warm-season perennial grasses, and winter annuals.

**SEASONALITY OF FORAGES**
<table>
<thead>
<tr>
<th>Insect</th>
<th>Protein %</th>
<th>Fat %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crickets</td>
<td>6.7</td>
<td>5.5</td>
</tr>
<tr>
<td>Termites</td>
<td>14.2</td>
<td>NA</td>
</tr>
<tr>
<td>Caterpillars</td>
<td>28.2</td>
<td>NA</td>
</tr>
<tr>
<td>Grasshopper</td>
<td>14.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Water Bugs</td>
<td>19.8</td>
<td>8.3</td>
</tr>
<tr>
<td>Spider</td>
<td>63</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: Bay Area Bug Eating Society
Chicken Foraging Helpful Facts

- The amount of sun and the time of day has the most impact on foraging activity.
- Spend more time outside foraging during the early morning and late afternoon, compared to around noon.
- Foraging during overcast conditions is higher than during full sun.
- To maximize foraging, provide shade and remove feeders in the morning when birds are most likely to forage.

- On pastures, birds may eat enough nutrients to supplement 10 to 30% of diet.
Why have my hens stopped laying?

- **Nutrition**
  - Completely balanced diet
  - Out of feed or water

- **Disease**
  - Vaccinate (esp. in confinement systems)

- **Age**

- **Management**
  - Heat
  - Overcrowding
  - Light
Nutrient Deficiency Effects

- **Salt** - feeding a salt-deficient diet will lead to increased feather pecking and a decline in egg production.

- **Calcium** - inadequate calcium consumption will result in decreased egg production and lower egg shell quality.

- **Vitamin D** - inadequate levels of vitamin D quickly results in decreased egg production.

- **Protein** - if dietary protein is too low or the amino acid requirements are not met, poor egg production and hatchability will occur.

http://www.extension.org/pages/68178/basic-poultry-nutrition
**Nutrient Deficiency Effects**

- **Fat** – impairment of the absorption of fat-soluble vitamins (A, D, E, and K) is the most serious consequence of a dietary deficiency of fat and will adversely affect egg production.

- **Water** - shortage of water for just a few hours can result in reduced egg production, so clean water should be available at all times.
Why have my hens stopped laying?

250 eggs per year = 1st year of production
**THE BASICS: EGG LAYING**

*Why have my hens stopped laying?*

- A layer will produce an egg every 1-2 days
- Pullets start laying when they reach 20-24 weeks
- First eggs will be small and on the floor
- Light hours (have a program)
  - Decrease light hours for growing pullets
  - Increase hours after they start laying with artificial lights (orange/red lights are best) to maintain 14-16 hr day

chickenadoption.co.uk
UF/IFAS Extension Sarasota County
http://sarasota.ifas.ufl.edu

UF/IFAS Solutions for Your Life - Poultry
http://solutionsforyourlife.ufl.edu/agriculture/livestock/poultry.html
• American Livestock Breeds Conservancy - http://albc-usa.org/
• Backyard Chickens - http://www.backyardchickens.com/
• Build A Chicken Coop Easy: How to Build a Chicken Coop - http://www.buildachickencoopeasy.com/
• 4 H Virtual Farm – Poultry - http://www.sites.ext.vt.edu/virtualfarm/poultry/poultry.html
• Heritage Poultry Conservancy - http://www.heritagepoultry.org/
• The City Chicken.com – http://home.centurytel.net/thecitychicken/index.html
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THANK YOU