Intro to PA Livestock Operations

- Welcome to Session III of AG 101.
- You should be able to hear music – and can control the MP3 Player shown in your view.
- Program will begin at 1:00 PM.
- Jerry Martin, Penn State, Moderating
Other upcoming trainings about livestock production in PA

- **Introduction to Livestock Production Systems:** February 23, 2011 in Centre County
- In-depth, face-to-face workshop provides an overview of the typical production systems in Pennsylvania for dairy, swine and poultry.
- Manure handling, contracts, marketing, economics, biosecurity issues, and dead animal disposal are also addressed.

REGISTRATION INFO: [http://panutrientmgmt.cas.psu.edu/ct_training_list.htm](http://panutrientmgmt.cas.psu.edu/ct_training_list.htm)
The Winter “Burst” focuses on Intro to Pennsylvania Farms and Livestock Operations

Session IV – 2/10/11
- Equine
- Specialized Species

Session V – 2/17/11
- Pre-farm visit preparation
- Biosecurity & other important info

FARM & FIELD VISITS
http://guest.cvent.com/d/vdqt1f
Issues YOU’VE identified about animal ag in PA

• Market prices for agricultural products
• Fertilizer and feed costs
• Crop yields
• On farm employment stability
• Legislation aimed at large-scale industrial agriculture that puts undue/unfair pressure on small family producers.
Issues YOU’VE identified about animal ag in PA

• Encroachment of populations not amenable to farming.
• Managing manure in a resource friendly fashion
• Waste runoff (such as from barnyards)
• Winter manure storage
• Pasture health (in grazing systems)
• Odor Control
• Bio-security
• Program Focus of Session III
  – *Dairy* Virginia Ishler, Penn State Dairy and Animal Science
  – *Swine* Robb Meinen, Penn State Dairy and Animal Science
  – *Poultry* Paul Patterson, Penn State Poultry Science
Agricultural 101 – Understanding Pennsylvania Dairy Operations

Presented by:
Virginia Ishler – Nutrient Management Specialist

With contributions by:
Dr. Dave Wolfgang – Biosecurity
Dr. Robert Graves – Housing and Manure Handling
What is biosecurity?

A collection of management practices which protect a herd from the entry of new diseases and minimizes the spread and/or adverse effects of disease within a herd.

Fecal – Oral is the common route of disease transmission.
Reducing exposure to disease

- Consider the paths for disease entry or spread
  - Cattle
    - purchased animals, heifers returning from grower, show animals
  - Manure
  - Pests, pets, wildlife
  - People
  - Feed
  - Water

- Take steps to minimize risk of disease entry
Transport

- Insist on clean transport
  - washed between uses
    - 60% of trucks contaminated with salmonella
- Don’t comingle with animals from other farms
- Use trained, conscientious haulers
- Minimize stress
Manure Management

- Consider flows
  - near feed storage
  - near youngstock

- Watch for carriers
  - equipment
  - people
Keep Feed Clean

- Rodent and bird control in storage
- Don’t use manure equipment in feed handling
- Preach caution in pushing up feed
Don’t be a fomite

❖ You should clean & sanitize
  ➢ clothes
  ➢ boots
  ➢ hands
  ➢ equipment

❖ Be conscious of
  ➢ entering facilities unnecessarily
  ➢ parking near or working with youngstock
  ➢ moving between different groups unnecessarily

❖ Consider the order of work routines
Poor management will overcome good immunology every time!

Fecal – Oral is the common route of disease transmission
Basics of Dairy Nutrition-
What do you need to know?

Forage testing and quality

Silages vs. pasture

General feeding management
Forage testing and quality

- Most important value – dry matter %
- Why?
  - Type of storage structure
  - Fermentation problems

→ Compared to →
### Haycrop forages

<table>
<thead>
<tr>
<th>Method</th>
<th>% DM</th>
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<tbody>
<tr>
<td>Convt tower</td>
<td>35 to 40</td>
</tr>
<tr>
<td>Oxygen limiting</td>
<td>45 to 60</td>
</tr>
<tr>
<td>Horizontal</td>
<td>30 to 35</td>
</tr>
<tr>
<td>Rnd bale silage</td>
<td>40 to 50</td>
</tr>
<tr>
<td>Dry hay</td>
<td>88 to 92</td>
</tr>
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</table>

### Corn silage

<table>
<thead>
<tr>
<th>Method</th>
<th>% DM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convt. tower</td>
<td>32 to 37</td>
</tr>
<tr>
<td>Oxygen limiting</td>
<td>40 to 45</td>
</tr>
<tr>
<td>(not ideal)</td>
<td></td>
</tr>
<tr>
<td>Horizontal</td>
<td>30 to 35</td>
</tr>
</tbody>
</table>
Comparing confined (silage) feeding with pasture

- Confined feeding – Advantages
  - Control of dry matter intake
  - Total mixed rations
  - Greater flexibility in using unusual byproduct feeds
  - Suitable for all herd sizes, especially herds with over 100 milking cows.
  - Forages can be harvested in a short period of time allowing for greater consistency throughout the year.
  - Easier for nutritionists to balance rations.
Comparing confined (silage) feeding with pasture

- Pasture feeding – Advantages
  - Savings in feed costs (less purchased grain required compared to confined feeding)
  - Animals are the forage harvesters
  - More time can be spent on managing cows
  - Enables smaller sized farms (<70 cows) to remain viable in the dairy industry.
  - Less farm equipment needed.
  - Allows animals to be off concrete and promotes a healthy environment for cows.
Comparing confined (silage) feeding with pasture

- Confined feeding – Challenges

- Poor forage quality (quality affected by maturity and storage) can last several months.
- Too few storage structures resulting in insufficient storage and management flexibility.
- Silos not matched to herd size and feeding rates.
- Labor intensive times of the year for harvesting.
- Feeding cows hot, uncured silage that is still fermenting.
- Forage quality changes in a silo before testing feed.
- Mold and mycotoxin problems.
Comparing confined (silage) feeding with pasture

- Pasture feeding – Challenges

- Adequate amount of forage (pasture), especially during drought years.
- Animals exposed to hot, humid weather resulting in dramatic drops in production.
- Pasture can be extremely high in protein and degradable protein, which results is most being excreted in urine.
- Pasture can have very low fiber levels, which can result in reduce milk fat.
Other nutritional requirements

- Feed availability
- Feed sequence
- Feed bunk space
- Bunk management
- Ration moisture
- Water quality and availability
- Mold and mycotoxin free feeds
Other nutritional requirements

☑ Adequate effective fiber
☑ High quality forages
☑ Balanced ration
Dairy Housing Facilities and Manure Handling

- Milking Cows
- Special Cows
- Baby Calves
- Youngstock
Tie Stall Barns

- 30 - 100 cows
- Cows are restrained in 4x6 area
- Resting, feeding, watering, milking and manure collection at stall
Concrete, rubber mat, mattress, organic bedding, sand

Controlled environment, above freezing
Dairy Tie Stall

- Gutter cleaner (solid/semi-solid, sand laden)
- Gravity gutter (slurry)
- Flush gutter (liquid)
Freestall Shelters

- 50 – 1000 cows
- Cows freely enter and leave 4 x 8 resting space
- Hard surfaced alleys for movement to feed, water & milking center
Freestall Shelters

- Manure deposited on travel alleys
- Natural ventilation, follow outside temperatures
- Newer shelters have curtain sidewalls
Dairy Freestall

- Tractor scraper (semi-solid/slurry, sand laden)
- Alley scraper (semi-solid/slurry, sand laden)
- Flush (liquid, sand laden)
- Slotted floor (slurry/liquid)
Baby Calves

- Individual hutches
- Individual pens and stalls
- Group housing
Weaning Calves
Youngstock
multiple groups

- Bedded packs
- Sloped resting – single and counter
- Freestall
- Pens
- Pastures
- Surfaced and mud lots
Bedded Pack  — Dairy, Youngstock
Questions?
Overview of Pennsylvania Swine Industry

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Department of Dairy & Animal Science
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What Drives Swine Industry Structure?

The Formula for Successful Management of Animal Production Systems…

Most things in modern industry structure are geared to promote health, or limit risk of poor health.
What Drives Swine Industry Structure?

- The Formula for Successful Management of Animal Production Systems...

\[ \text{Health} = \text{Welfare} \]
What Drives Swine Industry Structure?

The Formula for Successful Management of Animal Production Systems...

\[ \text{Health} = \text{Welfare} = \text{Production} \]
What Drives Swine Industry Structure?

The Formula for Successful Management of Animal Production Systems…

Health = Welfare = Production = Efficiency
What Drives Swine Industry Structure?

- The Formula for Successful Management of Animal Production Systems…

\[ \text{Health} = \text{Welfare} = \text{Production} = \text{Efficiency} = \text{\$} \]
US hog slaughter in millions

- 1975 = 68.7
- 1985 = 84.5
- 1995 = 96.3
- 2005 = 103.6
- 2008 = 116.5
Pennsylvania ranks 11th with over 1,080,000 animals marketed annually. About 0.9% of US production.
What does that tell us?

- Farms have gotten
  - Larger
  - More efficient
  - Specialized
Industry Business Structure (Pa)

- Larger pork processing plants
  - Hatfield Quality Meats (up to 10,000 hd/day)
  - Leidy’s (over 1,200 hd/day)

- Pork production integrators
  - Country View Family Farms (Integrated with HQM)
  - Hershey Ag
  - White Oak Mills
  - Independents/others

- Majority of swine produced under contract

Which means…
All-In-All-Out (AIAO) Production

- Entire groups of growing pigs leave room or building before new pigs arrive
- Clean and disinfect between groups
- Limits pig-to-pig and group-to-group exposure
  - *Leading to great improvements in herd health.*
Multiple Site Production

- Animals raised in AIAO systems are moved to buildings at different locations.
  - Body weights precise
  - Formulate for the present body weight
    - Diet meets requirements
    - Diet changed often

Pellets or Mash
Advantages of All-In All-Out & Multiple Site

- Health & Welfare
- Performance
- Specialized Feeding
  - *Phase Feeding*
- Specialized Labor
- Economies of scale
- Animal Units and nutrients spread over multiple locations
Breeding barn populations

- Sows...
  - Gestate for 114 days then **farrow**
  - Nurse for 18 days
  - Are bred 5 days after weaning
  - All within one unit or building

- Boars...
  - Most farms use Artificial Insemination (AI) and have only a few boars

- Piglets...
  - Moved to a nursery or grow/finish building at weaning for specialized care.
# 3 Types of Growing Pigs

<table>
<thead>
<tr>
<th>Production Stage</th>
<th>Age</th>
<th>Weight (in pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wean</td>
<td>16 to 24 Days</td>
<td>11 – 14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Called a <strong>Wean pig</strong></td>
</tr>
<tr>
<td>Feeder or Nursery Pig</td>
<td>10 Weeks</td>
<td>45 – 60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Called a <strong>Feeder pig</strong></td>
</tr>
<tr>
<td>Finish Hog</td>
<td>28 Weeks</td>
<td>240 – 280</td>
</tr>
<tr>
<td></td>
<td></td>
<td>265 - Current target</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Called a <strong>Market Hog</strong></td>
</tr>
</tbody>
</table>
Production Schemes – 1400-sow single site

Breeding/Gestation

4 Rooms

On Site

Farrow sows

Weekly fill

Wean one room per week

Breeding Sows
return to
Breed/Gestation
after weaning

On site
or
Off Site

NURSERY

Weaners
Production Scheme - Nursery fills Finishers

Wean pigs → Nursery → Feeder pigs → Finisher

On site or Off Site
Production Scheme - Wean-to-Finish Building

Keep in mind that one sow farm supplies numerous other farms.
Two common finishing floors...

Large-pen, self-sorting

Traditional penning.
Once again back in style.
Farm Mortalities

- Mortality composting is the most common disposal method.
  - Farms will have designated mortality facilities.
  - Finished compost is land-applied.
Some Typical PA Facilities

- 1,400 Sow Units
- Some 2,800 Sow Units
- One 5,600 Sow Unit
- 4,000 Head Nursery
- 2,000 Head Finishers
When you visit a hog farm

- Make appointment.
- Many people rely on the health of each herd.
Pork production is a biological system

- Nearly two-thirds of all dietary nutrients are excreted.
- No matter what we do, the conversion of plant material to animal protein will be less than perfect.

*Slotted floors allow waste to fall to manure storage below floor.*
More Pigs = More Manure

Manure from Grower-Finishers Often Stays on Home Farm, But…

….Manure from Sow Units Usually Exported
Feed No Longer Home-Raised

- Within the swine producing area -- net influx of nutrients:
  - N, P, K
  - Cu, Zn
  - Other trace elements
Manure Storage – PA Farms (2 common types)

Deep Pit

Shallow Pit

Pull Plug

60-mil HDPE Liner

Surface-water drain, Leak detection system
Summary Comment

- Economics of efficiency and health have driven historic innovation in the swine industry.

- Recent and future directions also determined by welfare, environmental, and social forces.

Health = Welfare = Production = Efficiency = $
Thanks!

Eat more pork!

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rjm134@psu.edu
Introduction to Poultry Production Systems

Paul Patterson & Mike Hulet
Department of Poultry Science
Penn State University
PA Poultry Industry Value

- Poultry value
  $1.065 bill (2008)
  <1.0% other chickens,
Pennsylvania Egg Industry

- 3rd largest egg state in USA:
  - 22 million hens, 6.6 billion eggs, 284 eggs/hen
- #3 in egg-type chick hatching (53 million)
- Top 3 Pennsylvania counties:
  - Lancaster - 7.7
  - Berks – 2.8
  - Lebanon – 2.4
Specialty Egg Prices

Advertised Prices for Shell Eggs to Consumers at Retail Supermarket
(cents/dozen)

Source: USDA AMS Weekly Retail Shell Egg and Egg Products Feature Activity
US Egg Industry

- 344 mill hens produced 90.1 bill eggs
- $8.22 billion, ave. price $.97/dz
- Hatching eggs: 13.35 billion broiler-type 12.45 egg-type .89 bill
Highrise House
Stackable Cages with Ceiling Inlets
Hen Complex
Deep litter
Aviary

Diagram of an aviary structure with measurements and layout specifications.
Enriched Colony
Fig. 21. Bird age: egg production, egg weight and egg mass
PA Broiler Industry

- 14th largest broiler state:
  153 million head, 860 million lbs,
  $393 million @ $0.46/lb

- Top PA counties:
  Lancaster 59 million head
  Lebanon 16 million head
  Snyder 14 million head
  Juniata 13 million head

- Top PA companies:
  Tyson Foods Inc.
  Farmers Pride
  Empire Kosher Poultry
  College Hill Poultry Inc.
PA Turkey Industry

- 9th largest turkey state in USA
  9 mill hd, 227 mill lbs,

- Two major and two minor producers
  - Plainville Turkey, New Oxford (Hain Pure Protein Corp)
  - Empire Kosher, Mifflintown
  - Jaindl Turkeys, Tamaqua
  - Koch’s Turkeys, Tamaqua
  - PIPP, Chambersburg
Livestock and Poultry Environmental Stewardship Curriculum

Module A. Introduction

Module B. Animal Dietary Strategies

Module C. Manure Storage and Treatment

Module D. Land Application and Nutrient Management

Module E. Outdoor Air Quality

Module F. Related Issues

http://www.lpes.org/les_plans.html
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PSU Poultry Science Department

HTTP://POULTRY.CAS.PSU.EDU/
• Recording of this session will be posted in the “AG DIALOGUE” box, along with a pdf of today’s powerpoint AFTER the live session at http://breeze.psu.edu/AG101

• Registered participants will receive post program/pre-program assessment survey following each live session. To register – visit http://guest.cvent.com/e/d/vdqt1f
NEXT on AG 101:

**Intro to Equine and Specialty Species**

Equine operations are increasingly common across the Pennsylvania landscape as are specialty species (alpacas, goat, bison, veal) and are often managed for reasons very different from the Pennsylvania livestock producers.

- February 10—1:00 to 2:30 PM at [http://breeze.psu.edu/AG101](http://breeze.psu.edu/AG101)
- Helene McKernan will moderate and be joined by:
  - Dr. Ann Swinker, Dairy & Animal Science – Equine Sciences
  - Dr. Robert Van Saun, Veterinary and Biomedical Sciences
- Register for AG101 at [http://guest.cvent.com/d/vdqt1f](http://guest.cvent.com/d/vdqt1f)