This year has seen record feed prices and record hog slaughter - not a good combination for hog producers. Pork producers have lost money 9 of the last 11 months and appear likely to suffer losses most of the time during the coming year. Profit depends, of course, on the cost of production and hog price. The key forces driving hog prices are exchange rates and pork trade. The key forces driving cost of production are energy prices and biofuels policy. Unfortunately, none of these forces are within the control of hog producers.

The rapidly expanding ethanol industry has more than doubled corn prices and driven up the cost of producing slaughter hogs by 50%. The era of $40/cwt breakevens for hogs has been replaced by $60/cwt cost of production. Because of high feed costs, market weights for slaughter hogs have been lower than last year causing the 2008 increase in pork production to be slightly smaller than the increase in hog slaughter. Barring an unexpected drop in corn prices, 2009 slaughter weights should be close to this year’s level.

Pork trade has been a surprising gift to hog producers this year. Although U.S. pork exports have increased for 17 straight years, this year’s exports are way up. During the first half of 2008, U.S. pork imports were down 14.7% and pork exports were up 68.5%. This combination meant that even though January-June pork production was up 10.4%, the supply of pork on the domestic market was up only 0.1%. Because of a growing U.S. population, per capita supply was actually down nearly 1%. Over one-quarter of U.S. pork production was exported during May and June.

This year’s big increase in pork exports was due, in general, to a weak dollar and, in particular to strong demand from China. The weak dollar has made U.S. pork prices very competitive with other exporting countries. A shortfall in Chinese pork production due to high feed costs, “blue ear” disease, and natural disasters combined with strong demand (perhaps due to the Olympics) are likely reasons for their increased imports. U.S. pork exports were a billion pounds higher during the first half of 2008 than the same six months last year. Half of the increase in pork exports went to China or Hong Kong. Both Russia and Japan bought over 100 million pounds more U.S. pork in the first half of 2008 than during the same period last year.

(Continued on Page 2)
Pork trade helped push August hog prices to record levels. Increased exports tightened domestic supply to the point that hog carcass prices in early August reached $86/cwt and the pork cutout value reached $94/cwt. Unfortunately, the early August price rally was followed by the fastest drop in prices in the last decade. Hog prices normally decline in late summer as daily pork production increases. But I fear a slowdown in exports was the primary reason for the late August collapse in prices.

The U.S. imported a record 10 million Canadian hogs last year. Roughly two-thirds were feeder pigs and one-third was slaughter hogs. Imports of Canadian hogs started 2008 strong, but dropped rapidly, especially slaughter hog imports. A strong Canadian dollar in the last few years has made exporting to the U.S. much less lucrative which has led to a reduction in the Canadian swine herd. Their July inventory survey reported a 4.6% decline in sow numbers.

![U.S. Pork Imports & Exports, 2000-2008](image)

USDA’s hog inventory numbers are encouraging. The light weight market hog inventory in the June report implied daily hog slaughter during the fourth quarter of 2008 will be up only 2-3% compared to October-December 2007. June-August farrowings are forecast to be down 2.0% and September-November farrowings are predicted to be 4.0% lower than a year earlier. Pigs per litter should increase and offset some of the reduction in the pig crop caused by fewer litters. Daily hog slaughter during the first quarter 2009 should only be a fraction lower than 12 months earlier. Hog slaughter during the second quarter of 2009 should be down roughly 3% based on the farrowing intentions for this fall. Red ink and high sow slaughter implies that hog slaughter should be even lower in the second half of 2009.

A potential area of concern is slaughter capacity. In the fourth quarter of 1998, the hog run exceeded slaughter capacity causing hog prices to drop to single digits. There is a chance a similar situation could develop this fall. It appears that non-holiday weekly slaughter during the fourth quarter will need to average within 2% of the largest weekly slaughter ever. Things will need to go smoothly for packers or hogs could backup and prices plummet.

Domestic pork demand is down and is expected to stay weak for a while. Slow economic growth and high energy prices have left U.S. consumers with fewer dollars to buy food. Declining oil prices would be good news for the economy, consumers and pork producers.

Pork prices should get support from other meats in coming months. Spring placements of cattle into feed yards
were down which implies late summer and fall fed cattle slaughter will also be down. Fed cattle prices are near record levels and are expected to remain unusually high in the coming year. The poultry industry was quick to respond to the run up in feed costs by slowing the rate of flock expansion.

My forecasts for hog slaughter and prices for 2008 and 2009 are below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Qtr</th>
<th>1000s</th>
<th>% YrAgo</th>
<th>$/cwt - live</th>
<th>$/cwt - carcass</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>1*</td>
<td>26,684</td>
<td>101.8</td>
<td>45.67</td>
<td>60.09</td>
</tr>
<tr>
<td>2007</td>
<td>2*</td>
<td>25,526</td>
<td>102.8</td>
<td>52.91</td>
<td>69.62</td>
</tr>
<tr>
<td>2007</td>
<td>3*</td>
<td>26,566</td>
<td>102.9</td>
<td>50.05</td>
<td>65.85</td>
</tr>
<tr>
<td>2007</td>
<td>4*</td>
<td>30,396</td>
<td>109.0</td>
<td>39.12</td>
<td>51.47</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td>109,172</td>
<td>104.2</td>
<td>46.95</td>
<td>61.78</td>
</tr>
<tr>
<td>2008</td>
<td>1*</td>
<td>29,597</td>
<td>110.9</td>
<td>39.53</td>
<td>52.02</td>
</tr>
<tr>
<td>2008</td>
<td>2*</td>
<td>27,942</td>
<td>109.5</td>
<td>53.12</td>
<td>69.89</td>
</tr>
<tr>
<td>2008</td>
<td>3</td>
<td>28,900</td>
<td>108.8</td>
<td>56 - 58</td>
<td>74 – 76</td>
</tr>
<tr>
<td>2008</td>
<td>4</td>
<td>31,250</td>
<td>102.8</td>
<td>47 - 51</td>
<td>62 – 67</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td>117,689</td>
<td>107.8</td>
<td>49 - 51</td>
<td>65 – 67</td>
</tr>
<tr>
<td>2009</td>
<td>1</td>
<td>29,000</td>
<td>98.0</td>
<td>49 – 53</td>
<td>65 – 70</td>
</tr>
<tr>
<td>2009</td>
<td>2</td>
<td>27,100</td>
<td>97.0</td>
<td>59 – 63</td>
<td>78 – 83</td>
</tr>
<tr>
<td>2009</td>
<td>3</td>
<td>27,600</td>
<td>95.5</td>
<td>61 – 65</td>
<td>80 – 85</td>
</tr>
<tr>
<td>2009</td>
<td>4</td>
<td>29,500</td>
<td>94.4</td>
<td>56 – 60</td>
<td>74 – 79</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td>113,200</td>
<td>96.1</td>
<td>56 – 60</td>
<td>74 – 79</td>
</tr>
</tbody>
</table>

*actual values

Since the filing of the latest Rules for the Bodies of Dead Animals (BODA) Act in September 2007, much has been said about new alternative methods of composting. This spring and summer many producers will be putting new mortality composting practices into place in their farms. Though much could be said about these rules, this article focuses on the potential use of vegetative treatment or filter strips around the composting site. Specific rules were included to protect surface and groundwater. During rainfall and storm events, nutrients and contaminants wash through uncovered compost. This is very similar to what happens with manure, silage storage, feed preparation areas, and waste water from animal holding areas. Runoff or effluent may be directed over a vegetative area to reduce amounts of nutrients, organic compounds, and pathogens that leave the compost site and potentially pollute the waters of the state.

Farms producing over 20,000 pounds of mortality (bodies of dead animals) annually and all animal processing operations (e.g. butcher plants, livestock collection points) are required to compost in a concrete lined storage structure designed in accordance with the liner criteria in the NRCS Waste Storage Facility standard (CPS-313). In addition, BODA Rules require that effluent leaving uncovered compost on these farms must be reintroduced

(Continued on Page 4)
immediately back into compost, collected and stored for crop production, or diverted to a wastewater treatment strip designed and constructed according to the NRCS Wastewater Treatment Strip standard (CPS-635). CA-FOs under General Permit cannot use a wastewater treatment strip, unless they have applied for an Individual Permit.

One essential component of a wastewater treatment system is a collection structure or a settling basin. The collection structure is designed to settle and collect solids and collect any dry weather leachate. The structure must have the capacity to collect the runoff water from a 25-year, 24-hour storm event (3.56 to 4.48 inches of precipitation, depending on location in Michigan) falling on the composting area and the area of the structure itself. Wastewater leaving this structure and going to the rest of the system must flow at a rate less than that caused by a 2-year, 24-hour rainfall event (2.09 to 2.42 inches depending on location in Michigan). The first 100 feet of the grass treatment strip must be at least 1% slope so that runoff does not pond and kill plants. The entire length of the treatment strip must provide at least 15 or 30 minutes of flow time for filtering and infiltration depending upon whether an overland or channelized treatment strip is used. A dense and vigorous vegetative stand and a shallow, uniform flow depth are critical for proper functioning of a filter strip. Concentrated or rill-causing flow is not acceptable because there is inadequate contact for removal of nutrients, solids, and other contaminants among the water, vegetation, and soil. Harvest of the vegetation in the treatment strip is beneficial, but the vegetation must be maintained at a height of four inches or more (see NRCS Operation and Maintenance Plan at: <http://www.mi.nrcs.usda.gov/technical/engineering/O&M_Plans.html>). Upright vegetation provides better treatment than lodged or flattened vegetation. Strips may be flashed-grazed, allowing the livestock access to the wastewater treatment strip when soil moisture conditions are low enough that loss of vegetative stand and compaction are avoided.

Farms producing less than 20,000 pounds of mortality annually may choose to compost on bare crop ground. Collection of effluent is not required, but it must not cause a violation of any federal, state, or local laws. Runoff must not pond in a low area and should be directed to a filter strip around the compost site. A filter strip is not the same thing as wastewater treatment strip. The NRCS Filter Strip standard (CPS-393) is intended for edge-of-field losses. These smaller composting sites which are located on bare crop ground must be moved to a new location every 2 years so a wastewater treatment strip system is not practical. More information about a wastewater treatment system or a filter strip can be obtained from your local Michigan NRCS Field Office. A complete copy of the BODA Rules can be found at <http://www.msu.edu/~rozeboom/>. 
Announcing MSUE Pork Team
State Wide Winter and Spring Programs!

The Pork Industry is ever changing! Can you maintain your current level of production and efficiency without challenging yourself to learn and know more about the industry your work in? Join the MSUE Pork Team to learn further how to improve your performance, your business and ultimately your bottom line. Watch for further details in the December issue of the Pork Quarterly and on-line at http://web1.msue.msu.edu/aoe/pork/.

Management and Care of Females After Weaning or Introduction into the Herd.

Co-Sponsors: Birchwood Genetics Inc. and Whitshire-Hamroc, Inc.

Meeting Dates:
Jan. 14 – Dowagiac, MI
Jan. 15 –Zeeland, MI
Jan. 21 – Mount Pleasant, MI
Jan. 22 – Coldwater, MI

Topics to include;
- Gilt Introduction and Management
- Improving AI Techniques
- Treating Lame Sows
- Better Nutrition for Better Reproduction
- Your Role in Public Perception of the Pork Industry
- Improving On-farm Communication
- Managing AI Matings for Internal Multiplication
- Managing Sows in Groups

Meetings will start at 5 pm and adjourn at 8 pm. Prior to each meeting, a PQA PLUS Certification Training will be held at each location.

2009 Green and White Education Fair and Show

January 31, 2009
Pavilion for Livestock and Agriculture Education, MSU, East Lansing, MI.

This day long event for Youth will feature;
- Swine Quiz Bowl
- Swine Skillathon
- Powerpoint Presentation Contest
- Essay Contest
- Scholarship Contest
- Market Hog Show

2009 Professional Pork Producers Symposium

Co-Sponsors: Michigan Pork Producers Association and Elanco Animal Health

Thursday, February 19, 2009
The Lansing Center, Lansing, MI

Topics to Include;
- Industry Outlook
- Production in Northwest Iowa
- Finishing Pig Feed Management
- Transportation Welfare
- Siting New Facilities
- Conducting On-Farm Research

2009 Michigan Pork Producers Association State Informational Meetings

This program is presented at four different locations across Michigan in late March. Watch for further details regarding topics, locations and dates in the December issues of the Pork Quarterly, and the Michigan Pork magazine, and on-line at Michigan Pork Producers Association website, www.mipork.org, or the MSUE Pork TEAM website, http://web1.msue.msu.edu/aoe/pork/.
The educational and informational needs of the pork industry are continuously changing. More specific and current information is needed, but less time is available towards continual training programs for employees, managers, and owners. The SowBridge program, modeled after the popular PorkBridge series, is designed to deliver timely and relevant information in a convenient manner. Programs are delivered over the noon period to maximize learner participation while minimizing interruption of the normal daily work schedule. It is our hope that increased dissemination of this information will improve understanding and productivity in breeding herds and farrowing systems.

Questions?

Call one of the following Extension contacts bringing you this program:

University of Minnesota
Mark Whitney (507) 389-5541
Lee Johnston (320) 589-1711

Iowa State University
Ken Stalder (515) 294-4683

University of Nebraska
Don Levis (402) 584-3816

South Dakota State University
Bob Thaler (605) 688-5165

Ohio State University
Dale Ricker (419) 523-6294

Purdue University
Brian Richert (765) 494-4837

University of Illinois
Robert Knox (217) 244-5177

Kansas State University
Joel DeRouchey (785) 330-4888

Michigan State University
Ronald Bates (517) 332-2280

University of Missouri
Tim Safranski (573) 884-7994

North Carolina State University
Eric van Heugten (919) 513-1116

SowBridge registration $250
Deadline is October 20, 2008

to participate in the first session.

Name _____________________________________
Company __________________________________
Address ___________________________________
_____________________________________________________________________
City __________________ State ____ Zip ______
Phone___________________________________
Email Address: ___________________________ (Required for non-U.S. mailing addresses.)

For credit card payment
Credit Card (circle one): Visa  Mastercard
Cardholder Name__________________________
Card Number _____________________________
Expiration Date ___________________________
Card Validation Number ___________________
(last 3-digit number on signature strip on back of card)
_____________________________________________________________________
Signature _______________________________  MSU
Who Should Enroll?

People involved in managing or caring for boars, sows, and/or their litters should consider enrolling. This includes owners, employees, technicians, managers, and technical service providers. The series is designed to improve the understanding and application of various tools and techniques involved in daily care of the breeding herd and piglets. If you work in or with breeding and gestation units, gilt development systems, or farrowing barns, this program is for you!

Why Should You Enroll?

Enrollment in the course gives you access to industry experts and current information. Not only do you get to share in their insights on a topic, but you also can ask questions of the expert and other producers, all from the comfort of your home, office, or swine unit.

Enrollment allows you to participate in an educational opportunity without having to worry about time off from work, travel distance, etc. Participation involves just 45 minutes of your time once a month and you can spend that time at your home, office, or swine unit.

Are There Limits to the Number of Enrollments?

No. The number of toll-free telephone lines should not be an issue for each session (11:30 a.m. central time). However, early registration is encouraged.

How Does the Program Work?

- One week prior to the scheduled session, participants will receive a CD in the mail. This CD contains the session materials, including any spreadsheets, video clips, publications, etc. provided by the speaker. A complete set of instructions are included with each CD. (The delivery process is slightly different for non-U.S. mailing addresses.)
- On the day of the scheduled session, participants call a toll-free number to participate in that day’s lesson.
- At 11:35 a.m. central time, the session host introduces the speaker for the day and the session will begin. Participants follow along on their computer as the speaker goes through the visuals.
- At the end of the formal presentation, (30 minutes in length) time is available for speaker questions and producer discussion. Total program length is approximately 45 minutes.
- Following each session, participants can continue to ask questions, or respond to other producer questions, via the sowbridge@lists.umn.edu discussion group (for those with e-mail access).

University of Nebraska, South Dakota State University, University of Minnesota, Iowa State University, the Ohio State University, University of Missouri, Michigan State University, Kansas State University, University of Illinois, Purdue University, and North Carolina State University are equal opportunity educators and employers.

Is There a Limit to the Number of People Per Site?

No. Enrollment is based on one dial-in telephone line. With a speaker phone, you can have any number of people gathered around the computer screen and telephone. The only requirement is that participants must be able to listen on the telephone while viewing the CD.

Does Participation Require Internet Access During the Session?

No. Each session presentation is on a stand-alone CD. Internet access is not utilized during the sessions. However, e-mail access is helpful if you wish to participate in ongoing discussions at sowbridge@lists.umn.edu.

Technology Requirements

- Telephone access
- Computer with CD drive

Get all 12 sessions for only $250!
To participate in the first session, registration must be received by October 20, 2008

*** This program is a great way to provide training to your farm staff for minimal time and money—once a month over the lunch period!!!
Introduction
There has been a move to increase the number of pigs penned together in finishing. Traditionally, pigs have been penned 20-40 pigs in a pen during the finishing phase. However over the last 10 years an increasing number of producers have moved to grouping pigs in pens of 100 or more in finishing. Unfortunately there has been little direct comparative information on the performance, behavior or health differences when finishing pigs are penned in small versus large groups in finishing.

Large vs Small Pens
Recently a study from Saskatchewan, Canada which utilized 2,304 pigs, compared those that were penned in groups of either 18 (small group) or 108 (large group). In addition, pigs were either crowded (5.6 sq. ft./pig) or were uncrowded (8.4 sq. ft./pig) within each penning (small vs large) treatment. Pigs were placed into finishing pens at approximately 83 lb and were approximately 207 lb at study completion. The same type wet/dry feeder was used in each penning treatment and feeder space allocation was 9 pigs per space. All water was supplied through the wet/dry feeders. The data collected included body weight gain, along with injury scores, percentage of pigs needing medical treatment and pigs removed. In addition the behavior of eating, standing, and sitting was also classified.

It was no surprise that pigs that were crowded grew slower than pigs that were uncrowded (2.27 vs 2.36 lb/day, respectively) (Figure 1). What was unexpected were the results from the penning treatment comparison. Pigs that were penned in large groups grew slower than pigs in small groups (2.28 vs 2.37 lb/day, respectively) (Figure 1).

Feed efficiency was also impacted by floor space allocation and group size (Figure 2). Pigs that were crowded had poorer feed efficiency than pigs that were not crowded (2.7 vs 2.5 lb feed/lb gain, respectively). As with average daily gain, pigs that were penned in large groups had poorer performance than pigs in small groups. Feed efficiency for pigs in large groups was 2.69 lb feed/lb gain compared to pigs in small groups whose feed efficiency was 2.54 lb feed/lb gain. The interaction of floor space allocation and group size was not significant for either average daily gain or feed efficiency.

Penning treatment did influence injuries. Pigs penned in large groups had more lameness and a greater severity of leg lesions compared to pigs penned in small groups. No difference was detected for flank and tail bites between the two
penning treatments. Percentage of pigs receiving medical treatments was similar (7.4%) across penning treatments as was removal percentage (3.6%). Floor space allocation did not influence injuries nor medical treatment or removal percentage.

Pig behavior was influenced by floor space allocation and penning treatment. The interaction of these two treatments was significant for percentage of the day spent eating and sitting (Table 1). Pigs that were penned in small groups and were uncrowded spent the largest percentage of time eating while pigs penned in small groups and were crowded spent the least percentage of time eating. Pigs that were penned in large groups, regardless of floor space allocation were intermediate in percentage of time spent eating. Pigs penned in small, uncrowded groups spent the largest percentage of their day sitting while pigs in small, crowded groups were intermediate and pigs penned in large groups were lower in percentage of time sitting. Space allocation did impact the percentage of their time lying (Table 2). Pigs penned in large groups spent more time lying laterally (on their side) and less time lying ventrally (on their sternum) than pigs penned in small groups.

Table 1. Impact of Crowding and Group Size on Finishing Pig Behavior

<table>
<thead>
<tr>
<th>Percentage of the Day Spent;</th>
<th>Small Group-Uncrowded</th>
<th>Small Group-Crowded</th>
<th>Large Group-Uncrowded</th>
<th>Large Group-Crowded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating</td>
<td>6.33&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.04&lt;sup&gt;d&lt;/sup&gt;</td>
<td>5.75&lt;sup&gt;c&lt;/sup&gt;</td>
<td>5.71&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Sitting</td>
<td>3.54&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.00&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>2.25&lt;sup&gt;d&lt;/sup&gt;</td>
<td>2.71&lt;sup&gt;cd&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup><sup>Adapted from Street and Gonyou, 2008.</sup><br><sup>b,c,d</sup> <sup>Means within a row without a common superscript differ (P<0.05).</sup>

Table 2. Influence of Group Size on Lying Incidence of Finishing Pigs

<table>
<thead>
<tr>
<th>Percentage of the Day Spent;</th>
<th>Small Group</th>
<th>Large Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lying Ventrally (on sternum)</td>
<td>23.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>21.17&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Lying Laterally (on side)</td>
<td>59.9&lt;sup&gt;b&lt;/sup&gt;</td>
<td>62.4&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup><sup>Adapted from Street and Gonyou, 2008.</sup><br><sup>b,c</sup> <sup>Means within a row without a common superscript differ (P<0.05).</sup>
Conclusions
This study further confirmed that reduced floor space allocation or crowding in finishing reduces average daily gain. This study also demonstrated that crowding can result in poorer feed efficiency. Pigs that were penned in large groups of approximately 100 grew slower and had poorer feed efficiency than pigs penned in small groups of 18. At the conclusion of this study, pigs penned in the large groups were 7 lb lighter and consumed 8 more lb of feed per pig than pigs penned in small groups. This would result in both a reduction in sale weight and a higher feed cost per pig marketed. Pigs penned in large groups also had a greater severity of lameness and leg lesions which is a welfare concern; however there were no differences in medical treatment or removal percentage which suggests that group size does not influence morbidity. Producers who are considering building new finishing facilities or renovating old barns, should consider the ramifications of choosing large group versus small group penning. Large group penning may result in lower initial capital costs and possibly on-going repair costs. However, reductions in profitability due to slower growth and poorer feed conversion may overshadow any savings realized in lower equipment costs.

Literature Cited

Using Carbon Dioxide to Euthanize Young Pigs

Jerry May, Extension Educator, Pork AoE Team, Gratiot County, Ithaca

We are taught as livestock care takers to provide the correct environment and care to allow all animals to thrive and meet their productive expectations. But even when provided the best of care there will be instances when animals become ill or injured and must be humanely euthanized. The National Pork Board has three broad standards for determining when euthanasia is warranted. According to the Pork Board:

- Animals showing no improvement, or having no prospect for improvement, after two days of intensive care should be euthanized.
- Severely injured or non-ambulatory pigs with the inability to recover should be euthanized immediately.
- Any animal immobilized, with a body condition score of 1, should be euthanized immediately.

In 2001, the Pork Board and the American Association of Swine Veterinarians (AASV) jointly published the “On Farm Euthanasia of Swine – Options for the Producers” outlining the acceptable methods of euthanasia for all stages of pig production. This booklet has become the on farm euthanasia standard for many operations.

Many farms struggle with young pig euthanasia. Blunt trauma, carbon dioxide, electrocution, and anesthetic overdose are all listed in the above booklet as acceptable methods of euthanizing nursing pigs. Electrocutioon is seldom used due to worker safety concerns and anesthetic overdose is used only under the supervision of a licensed agent, making that method impractical.

Recently I have had requests for information on boxes for using carbon dioxide (CO₂) to euthanize young pigs. The “On Farm Euthanasia of Swine” booklet lists CO₂ as an acceptable euthanasia method for all pigs up to 70# making this an acceptable method for nursery pigs as well as small pigs in the farrowing barn. I was able to find information on the operation of a CO₂ euthanasia device but very little on the practical side of building one on the farm, so I set out to put one together (Figure 1).
CO₂ is heavier than air therefore the container does not need a tight seal, although the cover should be secured so that the pig is not able to lift the lid and try to escape. Once the CO₂ is released to the container it will stay contained until the space is disturbed or the CO₂ is “dumped out”. Heavy plastic tote boxes or plastic garbage cans make excellent containers. I chose to use a plastic tote box. I cut one hole in the lid as an inlet for the hose carrying the CO₂, then two small holes on the opposite end as an outlet. The container should be the correct size for the stage of production it will be used in. For example, a 30 gallon capacity should be used for nursery pigs.

![Outlet Holes](image)

Figure 1. An example CO₂ chamber.

CO₂ is readily available where compressed gases are sold. Like acetylene and oxygen that you buy for your farm shop, CO₂ tanks are purchased under a lease/purchase arrangement and then returned and exchanged for refills.

Flow to the container must be controlled by a CO₂ control valve. The valve I used was a Victor with a rated flow of about 500 cubic feet per hour (CFPH) at 10 pounds per square inch gauge (PSIG). The CO₂ valves for welding deliver a low volume, up to 5 CFPH, which is not adequate for this purpose.

Use a heavy rubber hose to transfer the CO₂ from the tank to the box. Frost will develop on the hose during use. Light hoses may crack or break under these conditions.

For nursing pigs the recommended CO₂ concentration for euthanasia is 60 - 70% with a 5 minute exposure time. The suggested optimal inflow rate is 20% of the container volume per minute. The container design should allow for it to be pre-charged with CO₂. Pigs should be unconscious within 45 seconds and experience respiratory arrest within 5 minutes. (Morrow, 1995)

Using CO₂ is considered relatively employee safe. Caution needs to be taken if the euthanasia box is located in a small enclosed work room. CO₂ detectors, similar to smoke detectors, are available and should be installed if the unit is located in a tight space. Dead animals should be dumped from the container rather than picked out by the

(Continued on Page 12)
worker to avoid breathing in the CO₂.

While everyone associated with raising pigs recognizes the need for painless and humane euthanasia of terminally ill or injured animals, most farm employees feel uncomfortable performing the task. Poor euthanasia practices can lead to employee dissatisfaction, poor performance and disrespect for healthy animals (Morrow, 1995). CO₂ euthanasia offers a recognized option for terminating nursing and nursery sized pigs that farm employees find more acceptable.

**Resources**


PQA Plus Site Assessment Workbook, National Pork Board, 2007, National Pork Board, Des Moines, IA 50306