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Individual Mating Facilities for Swine

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Cooperative Extension Service

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November 1992

8 pages

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pork industry handbook

MICHIGAN STATE UNIVERSITY COOPERATIVE EXTENSION SERVICE • EAST LANSING, MICHIGAN

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A workable production schedule and an efficient mating program are important to a successful pork production system. Each producer has management circumstances to consider when planning a breeding facility. One important consideration for all producers is return on investment. The cost associated with an empty farrowing crate or finishing space must be recovered by the production from those crates or spaces which are occupied. Buildings must be utilized at or near capacity for maximum return on the investment. A breeding facility must allow development of a breeding and management program which consistently results in a predictable farrowing rate and litter size that ensure an animal for every available space. This level of performance will yield maximum return on investment and an even flow of animals throughout the production system.

When converting from a pen-mating to an individual mating system, consider the benefits and limitations listed in Table 1 (individual mating also is referred to as hand mating). Individual mating is considered an integral part of the breeding facilities described in this fact sheet. The primary focus is the breeding facility itself. However, a well-trained and motivated employee is of equal importance. Consider an incentive program for employees when farrowing rates consistently exceed a given level during each breeding period.

Guidelines for Planning an Individual Mating Facility

Newly constructed or remodeled facilities designed for individual mating should be planned with the known benefits and limitations in mind. Below are some factors to consider during the planning process.

General Layout: Plan for animal comfort, worker safety and labor efficiency. Design the system so one person can safely move animals and assist with breeding. Use narrow alleyways to

prevent animals from turning around. Design gate latches which are easily opened and closed. One design is shown in Figure 1. Provide adequate lighting for observation of animals. Use a 2-tube, 40-watt fluorescent fixture for each 200 square feet of floor space or one 100-watt incandescent lamp for each 60 square feet. Provide a convenient, well-lit area for recording mating information. A chalkboard or clipboard is an excellent way to monitor boar use. Develop a system which indicates current reproductive status of females (weaned-not mated, mated once, mated twice, etc.). This can be accomplished with paint stick marks or unique placement of individual sow cards. Clothes pins attached to a wire over individual crates to secure sow cards work well for some producers.

Production Schedules: Size the unit to accommodate animals for the desired number of matings per breeding period (see PIH-113, Calculating Swine Schedules). Also provide space for the desired number of animals to be housed in the unit during the pre- and post-breeding periods. Maintain gilts in this area for 2 to 4 weeks prior to breeding and also retain mated animals here for 25 to 30 days post-breeding for their 21-day heat checks. Plan additional space for short term housing of non-cyclic females and early weaned sows. Generally, one should provide space in the breeding area for females equal to 140% of the desired number of farrowings for the period. Provide one boar space for each desired pregnancy per period. For example, if the production unit is designed for 12 farrowings per week, provide 12 boar spaces in the breeding facility.

Boar Facilities: House boars individually, either in crates or pens. Individual housing increases longevity because it eliminates injuries resulting from fighting and mounting. Individual housing also allows control of feed intake, and therefore, size and condition of boars. Individually housed boars are usually easier and safer to handle. Ejaculation frequency is controlled because homosexual activity is eliminated. This results in a

Table 1. Benefits and limitations of individual mating in environmentally controlled facilities.

Benefits	Limitations
Known breeding dates enhance scheduling of facilities and labor.	Requires dependable, well-trained, and motivated labor.
A more detailed record system can be utilized and reproductive success or failure can be detected at an earlier date.	Specialized facilities are required and may be costly to build and operate.
A specialized building which generally accompanies an individual mating system can be designed to correct for a depression in reproductive rate associated with extremes in weather conditions.	Specialized buildings are not easily converted to other uses.
Boars can be penned and managed as individuals, which extends their useful lifetime.	
The number of matings per boar can be controlled.	
Females can be double mated at the correct time in relation to the onset of estrus.	
Selective matings are possible.	
Land required for breeding lots can be used for other purposes.	
Farrowing rate based upon first estrus services is generally increased as compared to pen mating.	
The spread in days within which a given breeding group is mated is more easily controlled.	

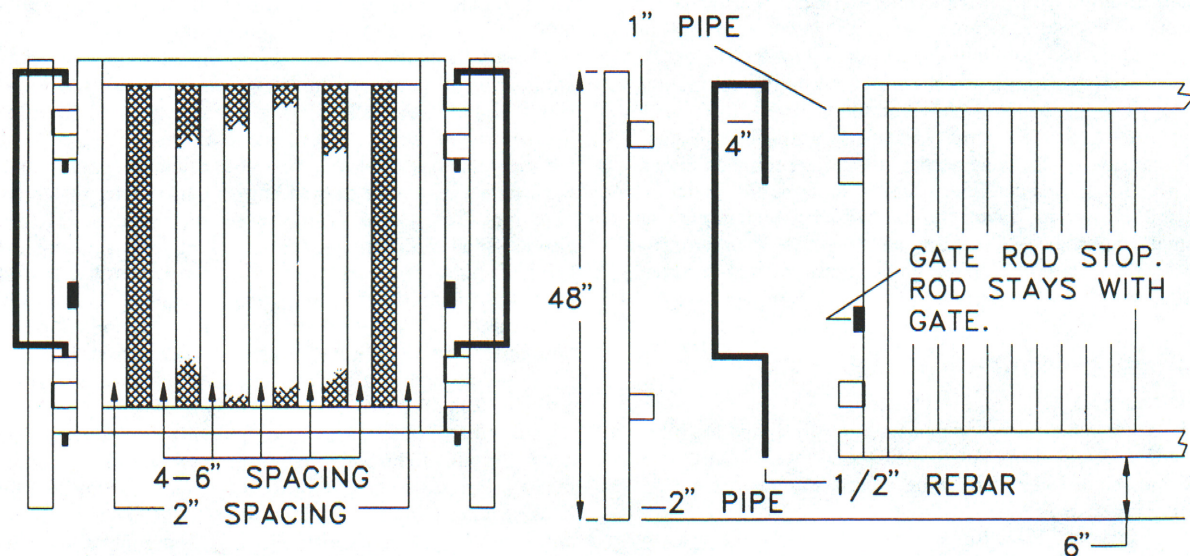


Figure 1. Gate and latch. Opens both ways and latch stays with gate.

more consistent and predictable level of boar fertility. Pens should be approximately 40 to 50 sq ft and crates 7 ft long and 28 in wide (24 in for younger boars). Eight-foot-long crates may be more appropriate for breeds or crosses which are larger and longer when mature. Do not house unfamiliar boars side-by-side in crates, because injuries may result from fighting. Crates make efficient use of space but are not recommended unless boars are used at least on a weekly basis. If not used weekly, boars must be turned out of their crates for exercise.

Sow Facilities: Research data are inconclusive as to the best system for housing post-weaned sows. Crates provide a means of controlling feed intake and reducing stress by preventing fighting when sows are regrouped after weaning. However, each sow must be moved from her crate once or twice daily for heat detection. If sows are grouped in pens during the post-weaning period provide 19 sq ft/sow and 16 sq ft/gilt. The number per pen should be kept low at about 5 or 6/pen. When penned sows come into heat, they have an opportunity to exhibit estrous behavior (standing and mounting). Sows observed to be in standing estrus can then be moved to the boar area for breeding. The remaining sows can be moved to the boars for a more intense heat detection program. Fighting among post-weaned sows kept in pens can be reduced by delaying movement of sows from the farrowing house until after nightfall and by placing a mature boar in their pen for two days. Return the boar to his housing area prior to commencement of heat detection and breeding.

Some breeding facilities are designed to accommodate replacement gilts from the time of selection at 5 1/2 to 6 months of age while others are designed to house them only for 1 to 3 weeks prior to mating. (See PIH-8, Managing Sows and Gilts for Efficient Reproduction, and PIH-89, Managing the Gilt Pool). Maintain a gilt pool large enough to guarantee the desired number of bred gilts for each week. By adding gilts and selling those in the pool that have not cycled after 25 to 30 days, a constant number of females can be maintained without allowing non-cyclic gilts to remain for long periods of time. There is little reduction in market price for such gilts if they are sold in the 250 to 275 lb weight range.

Temperature Requirement: Careful design of the ventilation system is essential to meet the needs of animals throughout the year, especially during extreme weather conditions. High temperatures (above 80° to 85°F) may cause lowered semen quality in boars, reduced farrowing rates and litter size, and increased embryonic death loss in females. Heat stress also can cause anestrus in females and decreased libido in boars. Therefore, in most geographical regions, some method of cooling should be provided during the hot months of the year. Cooling can be accomplished with sprinklers coupled with air movement, ventilation fans, evaporative coolers, earth tempered air or geothermal systems (see PIH-87, Cooling Swine).

Less is known about the influence of low temperatures, but breeding units should be maintained at a minimum of 55°F to reduce maintenance requirements of the animals and to eliminate water freezing problems. During winter months, animal density in the building may not be sufficient to generate adequate heat while allowing sufficient ventilation to control moisture levels. Therefore, some buildings may require supplemental heat for animal comfort and replacement of heat removed by ventilation.

Whether or not swine require a given amount of light for optimum reproduction is unknown. However, providing adequate light at all times to enable observation of animals in an undisturbed state enhances animal management.

Breeding Area: For successful mating, provide boars and sows with a slip-free surface which can be easily cleaned and kept dry. In most building layouts the breeding area itself is considered a neutral zone and animals occupy this space only during

heat checking and mating. The flooring can be slotted, woven wire, plastic-covered wire, solid concrete with a brushed or grooved finish or a surface covered with rubber mats. If woven wire is chosen, consider the larger diameter (5/16 in or 1/0 gauge) wire rolled flat on one side to improve traction.

Physical Arrangements and Management

Consider environmental conditions, production schedule, management ability and personal preference when selecting a building and floor plan. Floor plans described below incorporate many of the suggested guidelines. Consult with Extension personnel and PIH-28 Sow Gestation and Boar Housing, for additional arrangements. General breeding facility design criteria are outlined in Table 2.

Table 2. Basic design criteria for the breeding facility.

- Pen space
 - Boars—50 sq ft
 - Sows—19 sq ft
 - Gilts—16 sq ft
- Crate size
 - Boars—young 24 in W x 46 in H x 7 ft L
 - mature 28 in W x 48 in H x 8 ft L
 - Sows—24 in W x 42 in H x 7 ft L
 - Gilts—22 in W x 42 in H x 7 ft L
- Floor surface for breeding area
 - Slip resistant, cleanable
- Pen partitions
 - Breeding area and boars—4 ft H
 - Sows—36 in H
 - Use vertical rods with 4 in spacing
 - Clearance under gates and partitions—4 in
- Minimum floor slope—0.5% (1/16 in/ft)
- Minimum temperature for individually housed animals—55°F
- Alley width
 - Single animals—24 in to 28 in
 - Groups—36 in to 48 in
- Ventilation—minimum rates as listed in PIH-60 or MWPS-8
- Do not recess feed trough more than 2 in below floor level

Design 1

The design shown in Figure 2 houses replacement gilts, postweaned sows and boars. It was designed for animal comfort and labor efficiency. Features of this arrangement are summarized in Table 3.

Sows are generally weaned on Thursday and moved to the breeding room. They are grouped in pens of four according to size, condition and aggressiveness. Crates serve as free stalls or rear gates can be closed if desired. Replacement gilts are moved into the room 1 to 2 weeks prior to breeding. Estrus detection commences on the following Monday morning, with a majority of the matings occurring on Tuesday and Wednesday.

Females in heat (being mounted by pen mates) are moved one at a time to the breeding aisle and mated to the appropriate boar. Remaining females are moved into the breeding aisle where fence-line boar contact is provided. Those which react to the back pressure test are mated and moved back into their pen. If desired, the boar can be moved to the breeding aisle for the final heat check. Swinging gates which divide the breeding area allow for several matings to be in progress at the same time.

The number of sows which can be bred in an hour depends upon the number of females in the group, how many are in

estrus at a given breeding time and the number of breeding pens. If four breeding pens are provided, one person can heat check a group and breed up to 15 or 20 females per hour.

Alternative Layouts for Design 1. A variety of ventilation, manure removal and flooring systems can be incorporated into this design according to individual situations. Crates could be substituted for pens for boar housing and the additional space used for sow or gilt pens. In the post-weaning area, short (24 in) stalls could be used instead of the full length (7 ft) stalls.

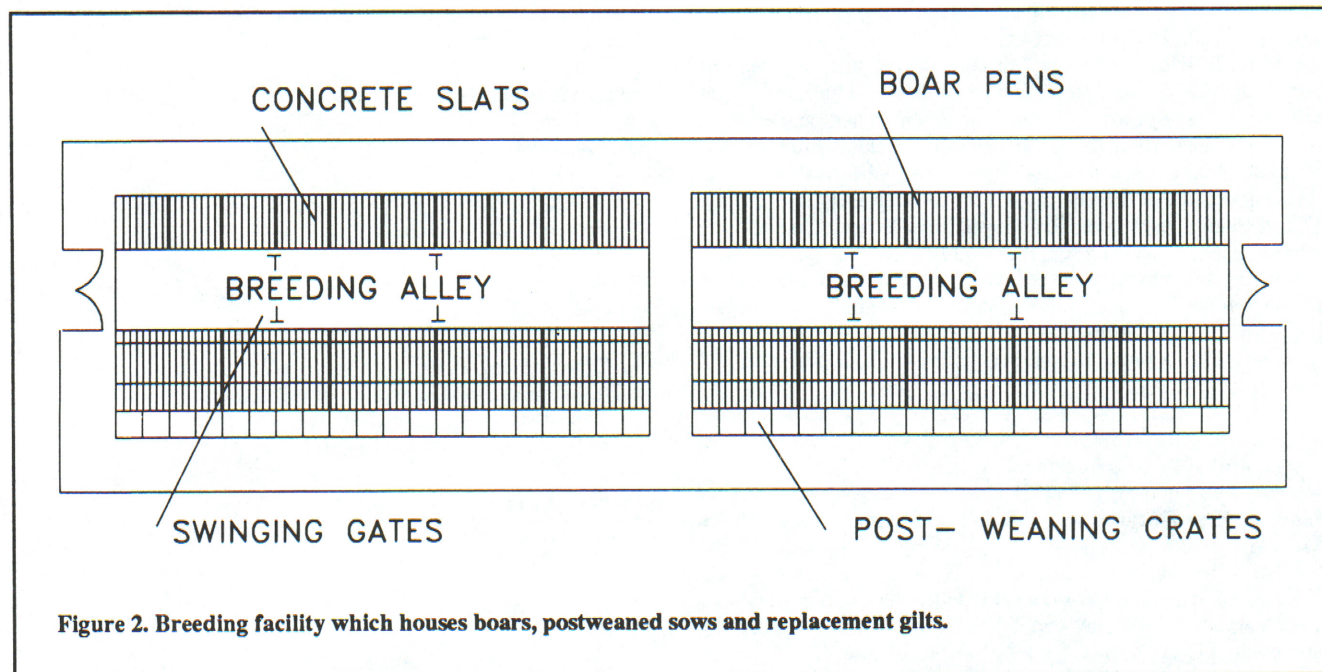


Figure 2. Breeding facility which houses boars, postweaned sows and replacement gilts.

Table 3. Description of breeding facility Design 1.

- Boar pens

5 ft W x 8 ft L x 4 ft H
Vertical pipe or bar pen partitions
7 ft concrete slats with 1 in spacing or 1/0 gauge or 5/16 in diameter woven wire
Recessed feed trough in back pen partition
Nipple waterer

- Breeding aisle

8 ft W (one swinging partition gate for every 2 or 3 boar pens)
Brushed finish, center crowned concrete or 1/0 gauge woven wire floor

- Sow pens

13.5 ft x 8 ft pens with 4 crates, 2 ft W or 10 ft x 8 ft pens without crates
Continuous concrete water/feed trough

Advantages:

Convenient animal movement.
Estrus can be observed without removing sows from crates.

Disadvantages:

Breeding activity in one pen can limit movement of boars.

Design 2

The design shown in Fig. 3 houses only boars and breeding pens. All open and gestating females are located elsewhere. The design details are listed in Table 4.

Generally, sows are weaned on Thursday and moved to facilities adjacent to the breeding barn. Replacement gilts could be housed in facilities adjacent to the weaned sows. Estrus detection commences on the following Monday morning by

moving females to a small pen adjacent to the breeding barn. Most of the matings occur on Tuesday and Wednesday. Females are heat checked in one of the four breeding pens. A female in heat will stand next to the boar in the heat check boar stall. The heat check boar faces the wall; therefore, the female usually remains in the breeding pen while the center alley gate is open for the breeding boar to enter. Boar movement is circular, i.e. boars enter the breeding pens from the center alleyway and

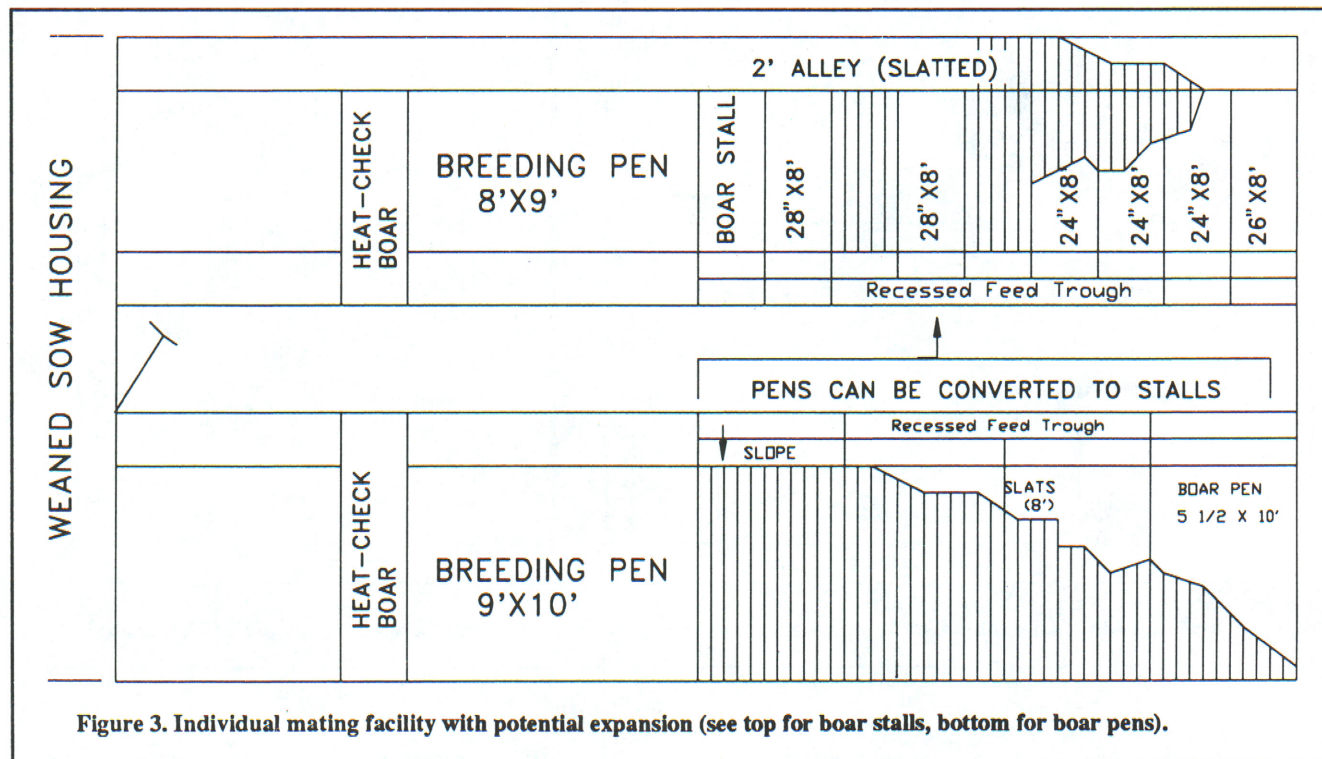


Figure 3. Individual mating facility with potential expansion (see top for boar stalls, bottom for boar pens).

Table 4. Description of breeding facility Design 2.

• Boar Crates

28 in W x 8 ft L x 4 ft H
1 1/4 in vertical pipe partitions
Concrete slats, 1 in slot
Recessed feed trough in concrete

• Breeding Pen

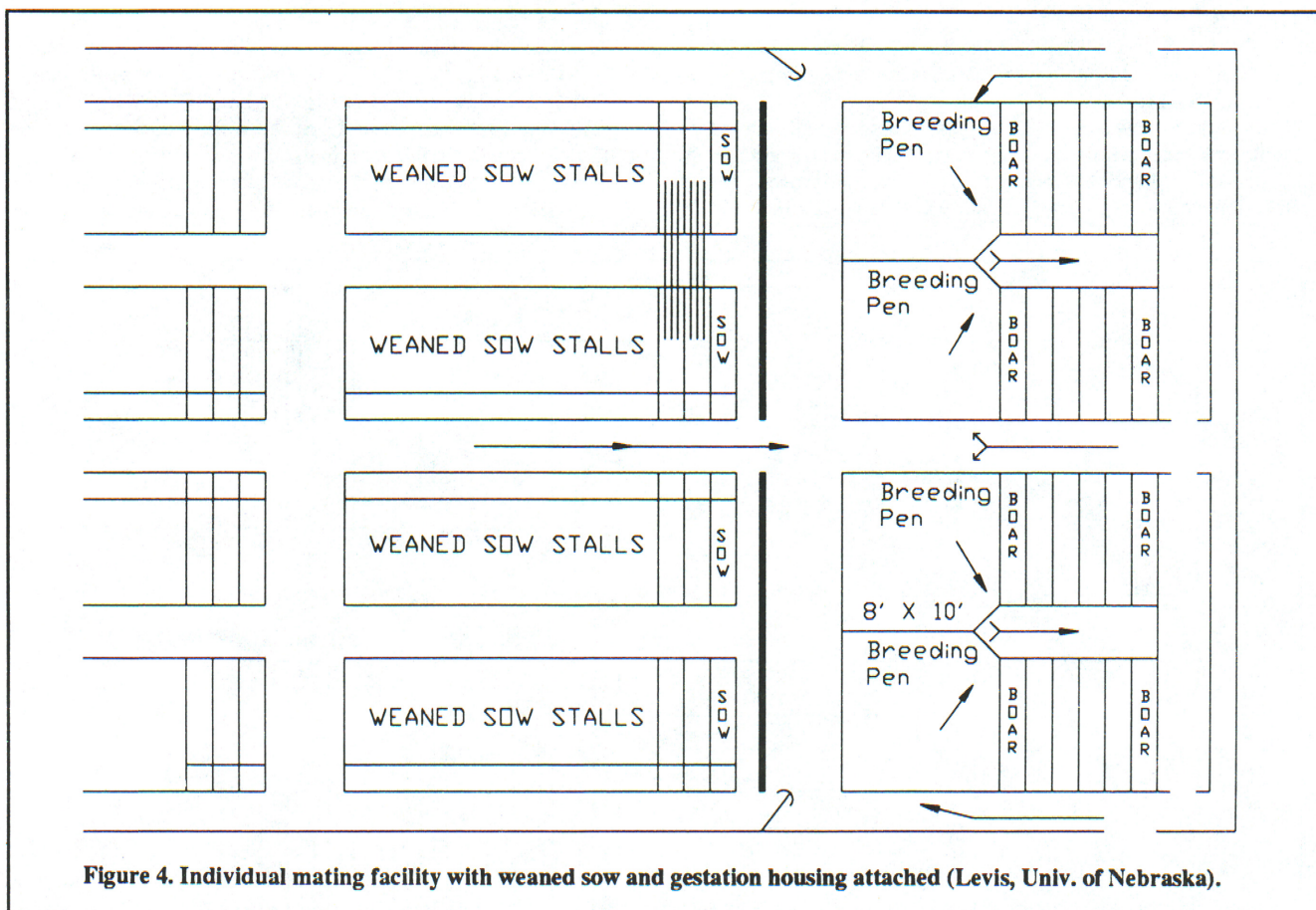
8 ft W x 9 ft or 9 ft x 10 ft L x 4 ft H
1/0 in gauge woven wire floor
2 in vertical pipe partitions with 4 in spacing next to boar stalls

Advantages:

Breeding activity does not limit boar movement.
Narrow alleys and general design provide for safe boar handling.
Mature boars are used for heat detection and younger boars can be used for actual matings.
Rapid immobilization exhibited by estrous females.

Disadvantages:

All females must be moved through breeding facility for heat detection.
Usable only for weekly breeding unless boar crates are replaced with pens or boars are exercised in breeding pens.



return to their stalls through a narrow (28 in) alleyway by the wall. After the females have been heat checked and (or) bred they are moved to a pen outside the breeding barn. When four breeding pens are used at least 16 to 20 females can be bred per hour.

Alternative Layouts for Design 2. This style of breeding facility can be used by any size swine operation. The number of boar spaces (crates) is matched to the size of the breeding group. Flexibility of the design allows for construction of a breeding-gestation facility in phases. The first phase is to construct a boar/breeding barn and keep all females in outdoor lots. The second phase is to attach a sow house to the boar barn which houses bred females indoors during the first 28 days of gestation. The last phase of construction would be to add enough space to house all females indoors as shown in Figure 4.

Design 3

This arrangement (Figure 5) provides space for boars and females to be located in close proximity from weaning up to 4 weeks post-breeding. Features of this design are described in Table 5. In typical applications of this design, one boar pen and 5 sow crates are provided for each female to be bred each week. Each set of 5 crates houses a newly weaned sow and females

which have been mated 1 to 4 weeks earlier. Thus, with a weekly breeding schedule one newly weaned sow is added and one sow which is 4 weeks post-breeding is moved out. Since sows are generally held here for 3 or 4 weeks post-breeding, more total building space is required, but the need for an equal amount of space in a gestation facility is eliminated. Additional space is required for sows which return to heat and those which are late in returning to estrus after weaning.

When possible, newly weaned sows are placed in a stall corresponding to the boar to which she will be mated. Sows are backed out of their stalls for heat detection and mating. Boar movement between pens is facilitated by providing gates which open from either end.

Gilts are generally housed within the building in pens. When detected in heat, they are brought to a boar pen for mating.

Summary

A properly planned and managed breeding facility can greatly influence the reproductive efficiency of the breeding herd. Breeding facilities need not be highly sophisticated to be effective but they must be designed so animals are comfortable and work routines are easily, quickly and safely accomplished.

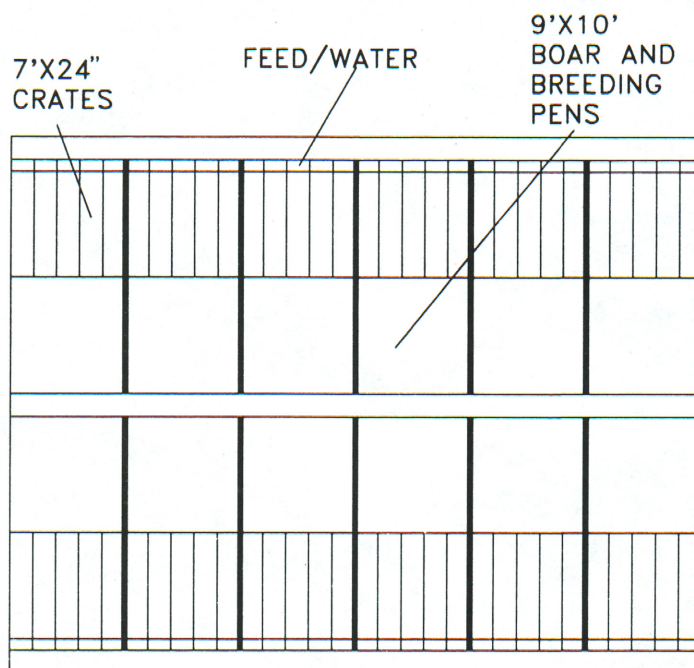


Figure 5. Individual mating facility which houses boars and females from weaning through 28-day post-mating.

Table 5. Description of breeding facility Design 3.

• Boar breeding pens

8 ft W x 9 ft L x 4 ft H
Vertical pipe or bar partitions (4 in spacing)
5/16 in diameter or 1/0 gauge woven wire floor
Stainless steel feeder in corner of pen partition
Nipple waterer

• Sow stalls

24 in W x 7 ft L
Concrete slats
Easy open and close rear gates
Continuous concrete water/feed trough

Advantages:

Simple construction.
Since females are retained in facility for 4 weeks, repeat breeders are easily detected and rebred.
Very little animal movement is required.

Disadvantages:

Boar pen serves as breeding pen, therefore floor must be designed for good footing during mating.
Boar movement from one pen to another is difficult.
Sows within a breeding group are interspersed throughout the facility.
Good identification is essential.
Females must be backed into breeding pen.



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