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A Beef Fertility Program

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The success or failure of a cow-calf operation depends greatly upon the reproductive efficiency of the herd and the pounds of calf weaned in the fall per cow in the herd. Some practical objectives for such an operation would be 95% conception rate and an average of 550 lbs. of calf produced per cow in a 12-month period. In order to attain these goals, sound management practices must be employed, and should include a comprehensive fertility program.

A fairly new concept in beef fertility programs is the use of a shortened calving season, the period recommended being 45 days. Such a shortened calving season, of course, requires that the breeding season also be abbreviated to 45 days which requires a certain amount of herd "synchronization" to make sure that all the cows are cycling and showing heats at the onset of the breeding season. The results are a calving season short enough to allow intensified calving management practices, and an increased average parturition-to-breeding interval, especially if the majority of the calves are born in the first third of the calving period. The increased parturition-to-breeding interval is important because it allows the cows more time to return to normal cycling and, consequently, a greater percentage of the cows will be cycling normally and showing heats at the onset of the next breeding season. More will be ready to conceive early in the breeding season so that more of the cows can be expected to deliver early in the following calving season, and the program will reinforce itself.

In order for such a program to work, the operator must do everything possible to assure that the herd is cycling at the onset of the breeding season. Nutrition plays a very important role. It has been shown that post-parturient cows fed on inadequate energy levels are slower to return to estrus and have a lower conception rate than cows fed diets meeting NRC requirements of energy. Cows should gain ½ to ¾ lbs. body weight per day between parturition and breeding which requires they be fed 16.0 lbs. TDN daily during that period. For calculations of TDN (total digestible nutrients), one should estimate TDN at 55-58% in alfalfa hay, 70-75% in small grains, 80% in No. 2 corn and 40% in oat and wheat straw. While protein requirements are also important and should be balanced with energy requirements, it is convenient to note that when energy levels are adequate, sufficient amounts of high quality protein are seldom deficient. Phosphorus deficiency also suppresses estrual cycles and behavior, and should be supplemented in the diet, either in the feed (at 1%) or in the salt.

Other things that will delay or suppress estrual behavior include stresses of any kind. Moving, chuting, and mixing of cattle are all activities that impose stress on the cows, and should be avoided before and during the breeding season. Disease and adverse weather conditions are more difficult to control, but can also be expected to produce stresses severe enough to alter estrus patterns.

In order to make sure that the herd is cycling normally, heat detection becomes very important. Anestrus must be kept to a minimum, especially when artificial insemination (AI) is used, and early de-

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tection of anestrus with appropriate treatment is the only satisfactory way to prevent big problems. Heat detection can be aided by the use of a good record system in which complete records are kept on each animal. Many silent heats may be detected by simply increasing the number of times per day that the herd is observed to four which, figures show, results in detection of almost 100% of the heats. The use of teasers, mechanical marking devices, heat detectors, and rectal examination are still other ways to increase the percentage of heats seen. Many problems may be averted by the use of annual prebreeding exams through early recognition and treatment of organic disorders.

The incorporation of replacement heifers into the herd may present special problems to the maintenance of a short-breeding-season-short-calving-period program. Heifers from the same herd often work in quite well since they reach 24 months of age during the herd's established calving season, and it is widely accepted that a cow's lifetime production will be greatest if she calves first at 2 years of age. This requires, however, that she conceives by 15 months of age, which indicates that sound management techniques should be used to bring her into puberty and to a sufficient size so she is capable. Puberty is correlated to age, breed, and weight. Therefore, replacement heifers should be selected for age and breed, and fed to gain one pound of body weight per day between weaning and breeding—a goal accomplished by feeding an amount equal to 8.0 lbs. TDN/head daily. In regard to the breed influence over puberty, it is generally accepted that crossbreds come into puberty early whereas the exotic breeds are later to mature. It has been suggested that the optimal weight to begin breeding the English breeds is 600-650 lbs. and 700-750 lbs. for exotics.

Studies have shown that, after her first calf, a heifer will require more time to show visible heats than older cows. In order for the first calf heifers to stay synchronous with the rest of the herd, they must have an extra thirty days to return to estrus post calving. To preserve the mature cows in a unit during calving and breeding season, the yearling replacement heifers must be bred earlier than the rest of the cow herd to allow them additional time between their first calving and their second breeding season. It is recommended that the breeding season for these heifers begin 20 days before the breeding season for the rest of the herd. This establishes a 65 day breeding season for the yearling heifers.

The actual method of breeding used matters very little, and, in fact, this type of program adapts well to either the use of natural service or artificial insemination. In the traditional pasture breeding set up, the bull is simply turned out with the herd for 45 days (65 days with yearling heifers). When using the AI technique, the cows may be bred exclusively by the artificial method, or may be serviced artificially for the first 20 days and then turned out with a "clean-up" bull for the remainder of the breeding season. The decision is left up to the management.

In discussing reproductive efficiency and fertility programs, there are some advantages to artificial insemination that should be considered. These are:

1. access to better sires whose production records are established and readily available.
2. decreased potential of disease spread due to antibiotically treated semen.
3. increased potential of herd improvement through crossbreeding which is very easy using AI.
4. the better the management required for the successful use of an AI program leads to all around better management and better records.

The disadvantages of using an AI program are seen in: (1) the increased cost of semen, labor, and facilities that are not required in pasture breeding, and (2) the use of AI does not necessarily remove the necessity for owning bulls, although it may reduce the number of bulls needed. Overall, the conception rate should be comparable to natural service assuming that good estrus detection and proper insemination techniques are used.

Up to this point the discussion of herd fertility has dealt entirely with the female, but male fertility or "bull power" is equally as important. Because the bull has a greater impact upon herd productivity than the individual cow, it is extremely important that the sire receive a complete examination prior to each breeding season. Such an examination should include both a complete physical exam as well as a semen evaluation. These examinations will assist in detecting obvious physical problems as well as gross microscopic abnormalities in the semen. A complete evaluation could include observing the bull mounting an animal in heat to assess libido.

In managing the use of a bull in a breeding program, it is important to relate his expected usefulness to his age. For example, bulls under 15 months of age are often not sexually mature and, thus, should not be used. As a general rule, young bulls should be used sparingly to prevent physical, as well as sexual, exhaustion. A rule of thumb to follow would be to limit bulls 15 to 24 month of age to 20-25 cows in a pasture situation. Mature bulls should be able to settle up to 35 cows, but there is a distinct advantage in using 1 bull to 25-35 cows rather than 4 to 100-140 cows. In the situation where hand breeding is used, one might expect a given bull to breed a few more cows than in the pasture situation. In this case, a 24 month old bull may be expected to service up to 35 cows while a mature bull will successfully breed 35-50 cows. If several bulls are available, it may be advantagous to rotate them after 10 to 15 days. Such a program may increase the calving percentage as much as 15-18%.

The tendency for many operators using the pasture breeding technique is to turn the bull in with the cows and forget him for the breeding period. Unfortunately, accidents frequently occur to hamper or curtail the bull's breeding ability, and may go undetected until the breeding season ends. It is most important to check bulls frequently to prevent costly losses, both in loss of the bull and in loss of time to the breeding program.

The selection of sires should be based on their performance, or projected performance, judged on genotype and potential of producing fewest dystocias. While there is no genetic evidence that virgin or yearling bulls produce fewer dystocias in first calf heifers, such a program is valid in that there is less chance of disease spread and less chance of injury to both the male and female since younger bulls are smaller. Most important in the selection of a sire, however, is to remember that selection on the basis of phenotype alone will not give a satisfactory result.

In conclusion, some basic recommendations are:

1. It is not economical to winter a non-gravid cow.
2. To maintain herd size, 15-20% of the cows will need to be replaced annually.
3. Save 50% more replacement heifers than actually needed. Then pregnancy test and sell all late calving or open heifers and cows.
4. Start to breed yearling heifers 20 days before the cow herd.
5. Shorten the breeding season of cows to 45 days. The breeding season for yearling heifers will be 65 days.
6. Breed heifers to bulls associated with the fewest calving problems.
7. Avoid stress during the breeding season.
8. When wintering cows, separate young and old cows so that competition for feed is reduced. Limit the size of herds to about 100 cows.
9. Provide adequate energy and nutrients at the critical times of the year. Remember that post-partum cows require high levels of energy and should be fed to gain ½ to ¾ lbs. body weight per day from calving to breeding to hasten return to normal cycling.
10. Increase the observation of the herd for accurate heat detection, and keep good, complete records.
11. Use only proven sires, and make sure each bull receives a complete physical examination and semen evaluation before each breeding season.

12. Do not overuse bulls, especially young ones, and check bulls frequently in pasture situations for early detection of injuries which may impair their breeding ability.

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Low Protein For Growing-Finishing Swine

by
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During the last summer many pork producers were looking for ways to lower their feed costs. Those feeding a complete supplement probably ran into some problems if they eliminated or severely reduced the supplement without replacing the vitamins and minerals, particularly calcium and phosphorous. In addition to reduced growth rate efficiency they may even have experienced poor bone development or possible fractures.

Producers who reduced only protein but kept vitamin and mineral content at recommended levels may have observed no problems or only a depression in growth and efficiency depending on the severity of protein restriction.

A report on the effects of reduced protein intake was presented at the recent Pork Producers Day held at Iowa State University. Four rations, adequate in vitamins and minerals, were used. They contained 0, 100, 200 or 300 pounds of soybean meal (SBM) per ton and calculated 8.6, 10.6, 12.6 and 14.6 percent protein. The performance of the pigs is shown in the accompanying table.

Growing pigs received rations with 100, 200 or 300 pounds of SBM. Daily gain and efficiency were very poor on the lower protein ration but performance on the 200 and 300 pound level of SBM was very similar. The same trend was observed for the finishing pigs.

Normal protein recommendations for growing and finishing pigs range from 13-16 percent. But during periods of high protein costs it is often cheaper to put weight on a hog by feeding a lower protein, cheaper ration, even though he may gain less efficiently and grow a little slower. It is essential to the health and well-being of the pig to maintain the vitamins and minerals at recommended levels.

Nutrient recommendations are available in extension bulletin PM-489, "Life Cycle Swine Nutrition," which is available at no charge from Publications Distribution, Iowa State University, Ames,Ia.

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Performance of Pigs Fed Varying Protein Levels

	Growing Pigs			Finishing Pigs		
Protein level, %	10.6	12.6	14.6	8.6	10.6	12.6
Initial wt., lbs.	49.9	48.8	48.1	127.2	126.3	126.2
Final wt., lbs.	99.9	135.1	135.0	174.7	205.9	219.1
Av. Daily Gain, lbs.	0.86	1.49	1.51	0.86	1.45	1.60
Feed/Gain	4.52	3.24	2.97	6.42	4.43	3.99