Introduction
The buller steer syndrome is a behavioral problem in groups of cattle that is recognized by the repeated mounting of one animal, the buller, by a group of animals, the riders (Stookey, 2001).

It is most often found in feedlot steers because this is were the majority of cattle are in a confined space and checked frequently. Regardless of the name, buller steer syndrome is also seen in heifers, cows and intact bulls. It is reported that bulling incidences can be as high as 5% but usually run in between 1% and 2% (Lincoln, 1981). The theoretical causes of this syndrome include changes in the steers environment, implants, stress, feeding management, social hierarchy, pen size and density, the weather, and possibly boredom (Ulbrich, 1981). The effects on the animal are physical injuries, susceptibility to other diseases and possibly death; the economic effect have not been estimated in over 20 years (Lincoln, 1981). Management of these bullers is extremely important for the sake of the animal’s health, as well as the profit of the feeding operation. Prevention, to maintain a minimum number of animals in the sick pen, is the key to a healthy pen of cattle and a large profit margin (Lincoln, 1981). This paper will discuss the possible causes and effects of this syndrome, as well as some prevention methods.

Results and Discussion
The causes:
The causes of buller steer syndrome are not totally defined and very little time and effort has been devoted to its research (Irwin et al., 1979). It is one of the top three health problems in a feedyard, ranking right below respiratory disease and footrot (Stookey, 2001). The weather and the seasons of the year have been thought to be a cause of this syndrome. A study by Brower and Kiracofe (1978) in Kansas showed that the number of bullers increased in July and August. However, a study done by Irwin et al. (1979) in the Texas Panhandle showed that bullers increased to a maximum in November and December with a minimum in July and August. Brower and Kiracofe (1978) also found that “a seasonal or environmental factor such as changing weather or wet, stormy weather” conditions related to an increase in buller incidences.

Irwin et al. (1979) found that weather conditions had no impact on the occurrence of bullers. Two different studies with the exact opposite results lead critics to believe that there is an underlying reason for the syndrome that is not related to weather or the seasons, especially since the cattle in these studies came from many different backgrounds. Pen density and group size are also suspected probable causes. Brower and Kiracofe (1978) found that pen density had a greater effect on occurrence of bullers than group size. “For every 10 head increase in total head per pen, the buller incidence increased .015%” and “for every 9.3 meters squared increase in pen size the buller rate decreased .05%” (Brower and Kiracofe, 1978). Irwin et al. (1979) results showed that regardless of pen space available, if the number of steers increased so did the incidence of bullers. Stress is thought to be a significant factor in the cause of buller steer syndrome. Stress includes, but is not limited to, a change in the steer’s environment, routine, or diet, transportation, handling, and processing (Brower and Kiracofe, 1978). Poor feeding management or uncontrollable circumstances can also cause undue stress on the animals. If for some reason feed is not delivered to the pen on schedule when it is expected, cattle will stand in front of the empty feed bunks waiting on the feed truck (Ulbrich, 1981). According to Ulbrich (1981), “Riding activity is seen to increase and usually persists until the feed situation is corrected.” When cattle are stressed they are more active which results in higher bulling rates. Boredom, which has not been taken very seriously, could be a more significant factor in causing bullers than most people realize or want to believe. A feedlot pen provides a very monotonous environment for a steer that would otherwise spend quite a bit of his time grazing. While in the feedyard all of the animal’s nutritional requirements are met with minimal time spent eating. This, Ulbrich (1981) explained, is the “ideal setting for the development of undesirable, sometimes destructive abnormal behavioral traits, as seen with ‘cribbing’ horses and feedlot buller steers.” Social hierarchy, better known as ‘pecking order,’ is a reasonable suspected factor in causing buller steer syndrome. From the time the cattle enter the yard to the onset of bulling varies greatly, but Irwin et al. (1979) found a range from 1 to 221 days with a mean of 61.4 days. This suggests that cattle establish a pecking order before bulling starts. Pecking order is established by a variety of factors. Steers that are weak or sick or even have a different coat color are pushed to the bottom (Lincoln, 1981). It is not uncommon for a buller to be a steer with a different coat color than the majority of the pen (Herrick, 1980). Whether the buller is the highest in the order or the lowest in the order is debatable. A study done by Pierson et al. (1976) reported that the biggest, most aggressive steers in a pen were the bullers while the steers at the bottom of the pecking order were the bullers in another pen. Brower and Kiracofe (1978) believe that some bullers are the target of aggression and therefore must be at the bottom of the pecking order. A project completed by Klemm et al. in 1983 found that bullers were the most aggressive animals in the pen and exerted this aggression towards riders and other bullers.

Hormones and implants seem to have a significant relationship with the buller steer syndrome. Bullers have higher urinary estrogen levels than normal steers, which in turn causes feminization and high tail heads. Bullers finish and are marketed at the same time as their original pen mates. The higher estrogen level in bullers allows them to have more efficient growth and performance records (Brower and Kiracofe, 1978). The type of implant used and the time lapsed between arrival in the yard and administration of implant was found to greatly affect bulling occurrences. A combination of progesterone and estradiol (PE), commonly known as Synovex-S, appears to cause a significant increase in percentage of bullers even though it has shown the highest growth rate of all implants. PE was compared to Diethylstilbestrol (DES), commonly known as Pellesteral, and Zearalanol (Z), commonly known as Ralgro. PE had a 2.46% of bullers, DES had a 1.37% of bullers and Z had a 0.46% of bullers in a study in 1979 (Irwin et al.). Groups of cattle without bullers had an average of 4.11 days between arrival and administration of the implant while groups with bullers had an average of 7.07 days (Irwin et al., 1979). However, it is believed that the majority of bullers are caused by improper implanting techniques used when workers are in a hurry and not by the implants themselves (Lincoln, 1981). This causes the pellets to be crushed and absorption rates increase which may result in bullers (Herrick, 1980). Another source of hormones that is introduced into a steer is Coumestrol. It is an estrogenic compound that collects on alfalfa leaves when they are damaged by fungal pathogens (Ulbrich, 1981). Therefore, it is easy to conclude...
that the more estrogenic compounds in the steer will cause a higher incidence of bullers. Directly related to hormones are pheromones. The increase in estrogen in buller steer accounts for a pheromone secretion (Brower and Kiracofe, 1978). Klemm et al. (1983) studied the effect of cauterizing the vomeral organ (VNO), which is the main receptor of pheromones, and discovered that the VNO does not play a major role. Brower and Kiracofe (1978) did a pheromone study that indicated pheromones were present in buller steers and noted a second stimulus. This second stimulus was the stance of the bullers that triggered the mounting behavior of riders. Ulbrich (1981) points out that the relationship between growth promoting products and pheromone secretion is still unclear. What is known is the facts that if you inject buller steers with estrogen, buller occurrences increase but if you inject bullers with testosterone, occurrences decrease (Brower and Kiracofe, 1978).

The effects
Buller steer syndrome affects the buller greatly. The buller’s tail head and rump area usually have the hair rubbed off of them (Lincoln, 1981). The riders will follow and mount the buller until it can no longer stand (Irwin et al., 1979). The bullers experience reduced weight gain, are more susceptible to secondary infections and occasionally die. While the effects on the bullers’ health are obviously detrimental, the economic effects are unclear. In 1979, about 20% of Kansas feedlots replied to a questionnaire saying the incurred a loss exceeding $330,700, which translates to $23.68 loss per buller. In 1981, Dr. Stuart D. Lincoln, D.V.M., Ph.D., estimated the loss to average about $50 per buller. This loss is because of the additional facilities, labor, rations, bookkeeping, and vet expenses. The loss does not include carcass losses of surviving bullers. Trimming of the loin area, the most valuable cut, is a necessity because of bruising and discoloration (Ulbrich, 1981). If a feedyard has 100,000-head capacity and an average 2% buller rate, with a loss of $50 per buller, that feedyard is losing $100,000 on bullers. This does not include discounts at the packinghouse. Therefore, good management is a necessity. When bullers are present, pen riders should remove them to a buller pen as soon as they are noticed. The implant should be checked and the steer should be checked for serious injuries and secondary infections. Bullers usually become no longer attractive after 3 days of isolation and can be returned to their original pen (Irwin et al., 1979).

Prevention
Prevention is the key to minimizing losses. Using the proper implanting techniques and putting fresh cattle in a permanent pen where no new cattle will be added upon arrival in the yard can reduce buller incidences (Lincoln, 1981). According to Dr. John B. Herrick, D.V.M. (1980), “if you use the correct implanting technique, bulling will be held at approximately 1% with any implant.” In the Southern Alberta Beef Review (1999) it is stated that allowing pens to establish a pecking order before implanting them greatly reduces bulling occurrences. If the situation will not allow the buller to be removed, not implanting at all could be beneficial (Sprague, 1999). Dave Rueber (2001), a Beef Enterprise Consultant, suggests not changing rations too quickly, keeping rations free of moldy feed, and adding upon arrival in the yard can reduce buller incidences (Lincoln, 1981). Before feedyards spend money to do this, research should be done to prove boredom is a true cause of buller steer syndrome. Bullers, who become inactive when placed in a buller pen, can become active again when returned to their original pen (Klemm et al., 1983). Klemm et al. suggests studies need to be done on the riders because of the possibility that they are the ‘culprits’ in causing the buller steer syndrome. Obviously more research is needed and worthwhile because it involves the health of our world’s food supply as well as the economic impact it has on our nation’s feedyards.

Conclusion
As you can tell, buller steer syndrome is not caused by one simple factor but is a manifestation of many underlying factors. The weather, seasons of the year, stress, boredom, pecking order, aggression, implants and pheromones are all suspected and probable factors. Much more research is needed to determine the exact causes so that preventative measures, if possible, can be taken. Boredom, for instance, can be decreased by environmental enrichment (Ulbrich, 1981). Before feedyards spend money to do this, research should be done to prove boredom is a true cause of buller steer syndrome. Bullers, who become inactive when placed in a buller pen, can become active again when returned to their original pen (Klemm et al., 1983). Klemm et al. suggests studies need to be done on the riders because of the possibility that they are the ‘culprits’ in causing the buller steer syndrome. Obviously more research is needed and worthwhile because it involves the health of our world’s food supply as well as the economic impact it has on our nation’s feedyards.

Literature Cited