CASE STUDY: Scientific Veal Production and Opposition Legislation in New Jersey

M. L. WESTENDORF, PAS
Department of Animal Science, Rutgers, The State University of New Jersey, Cook College, New Brunswick 08901-8525

Abstract

Recent efforts by animal rights groups to limit livestock production practices have focused on veal production. Legislation has been introduced in California, Illinois, and New Jersey that would ban or limit certain aspects of veal production. The legislation in New Jersey would ban tethering, mandate the feeding of iron supplements shortly after birth, and mandate the feeding of “digestible fiber” beginning at 14 d of age. All of these requirements may be contraindicated for optimal veal calf health. In addition, they invite more extreme measures. For example, the tethering ban may be extended to all dairy and beef animals up to 340 kg (750 lb) and could extend to adult and junior cattle shows and exhibitions as well. This paper describes the effects of these practices (tethering, controlling iron intake, and limiting fiber intake) on calf health and management. Portions of this paper were written to provide the New Jersey legislature with a science-based perspective on veal-raising practices addressed in the legislation. Finally, this paper will seek to point out implications of this and other legislative approaches to limit livestock management practices.

(Key Words: Veal, Tethering, Iron, Digestible Fiber, Animal Rights Groups.)

Introduction

Public perception of agriculture is often very different than the realities of agricultural production. Perhaps the best example of differences between public perception and agricultural reality exists in the veal industry. Veal production has long been assailed (Farm Sanctuary, 2004) as “cruelty on factory farms.” According to Stull and McMartin (1992), Stull and McDonough (1994), and Wilson et al. (1994, 2000), veal calves are provided exceptional individual care on small family farms. Recently, nearly identical legislation was introduced into the legislatures of New Jersey, Illinois, and California (New Jersey State Legislature, 2002; Illinois General Assembly, 2003; California Legislature, 2003) that would criminalize certain veal management practices (Figure 1). Similar legislation was first introduced into the United States Congress in 1987 (United States Congress, 1987) and in nearly every subsequent Congress through 2000 (United States Congress, 2000). This legislation has been promoted by animal rights groups who are politically active and have targeted the veal industry (Farm Sanctuary, 2004). The legislation would require practices that are detrimental to calf health and well being, while banning practices that have been shown to maintain health and well being. The main points of the legislation are to forbid the use of tethers in raising calves, to require feeding fiber to neonatal calves as young as 14 d of age and to require feeding iron to neonatal calves. If this legislation were to proceed, it could theoretically lead to banning the tethering of dairy calves, cows, livestock at fairs, or other contemporary livestock management practices. Although there is no veal production in New Jersey, it is likely that legislation has been introduced here with the hope of using the state as a platform for similar legislation in New Jersey and other states. Portions of this paper were written in response to a request by the New Jersey Department of Agriculture to provide the New Jersey legislature with a science-based perspective on veal-raising practices addressed in the legislation.

Results and Discussion

Tethering. It is common, on dairy farms, to tether calves. It helps to
AN ACT concerning the humane treatment of calves raised for the production of veal and supplementing Title 4 of the Revised Statutes.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

1. No person shall raise a calf for the production of veal unless the person complies with the following requirements:
   a. The calf must be raised in an enclosure of sufficient size to permit the calf to be free to turn around without difficulty, lie with its legs outstretched, and groom itself, without any impediment such as chaining or tethering; and
   b. The calf must be fed a daily diet containing sufficient iron to prevent anemia and maintain it in good health and vigor and, if the calf is more than 14 days old, it must be provided each day with food containing sufficient digestible fiber to prevent impairment of the development of its rumen.

2. The provisions of section 1 of P.L.1995, c.311 (C.4:22-16.1) to the contrary notwithstanding, any person who violates a provision of this act shall be guilty of a disorderly persons offense.

3. This act shall take effect immediately.

STATEMENT

This bill would require that persons raising calves for the production of veal must do so in a humane way. Specifically, this bill would require that calves be raised unchained or tethered in an enclosure of sufficient size to allow the calf to move and groom itself, and be fed a diet sufficient to prevent anemia or impairment of the digestive tract. This bill would further provide that any person violating any provision of this bill would be guilty of a disorderly persons offense, and thus subject to a fine of up to $1,000 and a prison term of up to six months.
or lessening the risk of gastrointestinal infection in calves tethered in stalls. At the same time, calves are still able to sleep in a normal, comfortable, recumbent position.

Tethers also prevent other unwanted or aggressive behaviors between calves. Some calves are more aggressive toward other calves (Veissier et al., 1994, 1997, 1998). Tethers help to limit group interactions and allow head, neck, and visual contact, which may prevent aggressive interactions and reduce health-related problems often observed in group-housing situations (Wilson et al., 1994).

In a survey of California veal facilities (Stull and McMartin, 1992; Stull and McDonough, 1994), it was determined that veal calves tethered in individual stalls are healthy, grow fast, and are not under stress as evidenced by blood cortisol concentrations and neutrophil to lymphocyte ratios. Those researchers (Stull and McMartin, 1992; Stull and McDonough, 1994; Wilson et al., 1994, 2000) concluded that the major factor adversely affecting veal calf welfare was an inadequate immune system upon arrival at the veal facility. It is easier for animal caretakers to feed, administer medications, and perform routine management practices when calves are tethered; untethered calves will most likely be treated in chutes or perhaps manually restrained, resulting in increased stress. Stull and McMartin (1992) also concluded that individual stalls are useful for managing immune-compromised animals arriving at the facility because they provide a controlled environment for management and treatment.

The use of specialized animal stalls and tethers is accepted as a science-based industry standard of management (Stull and McMartin, 1992). These stalls protect growing veal calves, reduce disease problems common in growing calves, and facilitate individualized feeding and management. Veal calves can comfortably lie down in natural positions (sternal recumbency) (Stull and McMartin, 1992; Wilson, 1994), stand up, and groom themselves. Individual stalls have been shown to help prevent the spread of disease by limiting both fecal contamination of the feed and calf-to-calf contact (Stull and McMartin, 1992; Wilson et al., 1994). Tethering veal calves in stalls allows farmers to provide individual attention and ensure that each calf is well fed, healthy, and in proper body condition (Wilson et al., 1994). Iron status (usually measured as hemoglobin [Hgb] or hematocrit [Hct] percentage) can be easily monitored to prevent anemia.

Veal calves are marketed between 18 and 20 wk of age, at which time they weigh nearly 230 kg (500 lb). Animals of this size are larger and more difficult to handle than small calves. Tethers provide a safer, easier environment for animal management, protecting both calves and those who work with them.

According to Van Putten (1982) early weaned calves will suck anything that resembles a teat. This could include the navel or sheath of other calves. Veal stalls and tethers prevent this.

Proposed veal legislation (New Jersey State Legislature, 2002; Illinois General Assembly, 2003; California Legislature, 2003) would prohibit the use of tethers in veal calf production. As measured by growth rate, health, neutrophil to lymphocyte ratios, and cortisol concentrations, tethers are not apparently stressful to animals (Stull and McMartin, 1992; Stull and McDonough, 1994). They are an acceptable science-based management practice in the production of veal.

One concern related to passage of this bill is what it might mean for dairy farmers who currently tether their calves or for those who keep adult cows in barns with some form of neck restraint. Individual pens or hutches are effective means of raising dairy calves (Quigley et al., 1994, 1995). Calves may remain in these pens until weaning, at which time they are grouped with other calves of similar age and size. According to the USDA-National Animal Health Monitoring System (NAHMS) (2002a), the average dairy calf is weaned at 8.4 wk of age. Calf hutches are outside huts that provide a protected, well-ventilated environment. Calves are often tethered to the front of the hutch on a 2- to 2.5-m tether (6 to 8 ft) that allows full movement but still keeps calves separated to prevent cross-infection. Nationwide, according to the USDA-NAHMS (2002a), 58% of dairy calves raised inside are kept in individual pens. For those raised outside, 42% are raised in hutches; this number might be even greater because it does not include animals raised off-site. The proper use of individual calf hutches is described by Battaglia (2001), who stated that they are “a good option” for calf raising. Their use is an acceptable science-based management practice (Quigley et al., 1994, 1995; USDA-NAHMS, 2002a).

There has been discussion in the New Jersey legislature for an exemption to allow tethered animals at shows, fairs, and exhibitions. The New Jersey law could adversely affect all dairy and beef farmers. If enacted, the law might eliminate tethers and stalls for other classes of cattle. It also could have ripple effects in other states, where New Jersey could become a platform for similar legislation.

Iron Management. According to Larson et al. (1985), cow’s milk is naturally deficient in iron. In baby pigs, because of low iron stores at birth, a rapid increase in blood volume after birth, a rapid growth rate, and low iron in sow’s milk, it is common to replenish newborn piglets with injectable iron. Management of iron intake, circulating and muscle levels, is one of the challenges in veal production. The amount of iron in the diet of veal calves is carefully controlled to produce the pale meat product demanded by the marketplace. This must be done while maintaining optimal health and nutrition.

Veal farmers and feed companies monitor iron intake and iron status of veal calves to prevent anemia (Bremner and Dalgarno, 1973a,b;
Bremner et al., 1976; Stull and McMartin, 1992; Wilson et al., 1994), because veal farmers would suffer economic losses if calves were to develop anemia. One of the first visual signs of iron-deficiency anemia is reduced feed intake and growth. Other signs would be general unthriftiness, rough hair coat, labored breathing, and elevated heart rate. Death would occur in extreme cases. Veal farmers do not wish to risk the health, growth, and well-being of their investment.

Feeding iron beyond the calf’s minimum needs does not improve its performance, health, or well-being (McFarlane et al., 1988). Iron management programs limit excessive iron intake and the concentration of the iron-containing pigment myoglobin in the muscle (Bowers et al., 1989; McFarlane et al., 1988; Wensing et al., 1991; Wilson et al., 1994). Controlling iron intake may also reduce risks from iron-dependent pathogens in the small intestine. Pathogenic bacteria, such as Salmonella and Escherichia coli, require iron for growth (Weinberg, 1999; Gil and Rueda, 2000). These bacteria often cause scouring and diarrhea, infections that are the leading cause of death in calves (USDA-NAHMS, 1996, 2002b). Orally ingested iron may be a contributor to these deaths. According to Weinberg (1999), Newman (1995), and Gil and Rueda (2000), excess iron can stimulate the growth of pathogenic bacteria in mammals. This stimulus appears to be related to the bacterial uptake of iron. Lactobacillus does not require iron; these are the beneficial bacteria found in yogurt. By feeding milk that is relatively low in iron (Institute of Medicine, 1999; Weinberg, 1997, 2001), Lactobacillus may gain a competitive advantage over pathogenic bacteria, resulting in better calf health and well-being. Most veal farmers use injectable iron to supplement calves upon arrival, although oral supplements may be used later in the production cycle.

According to Bremner et al. (1976), the best indicator of anemia in veal calves is reduced feed intake (appetite). Blood Hgb and packed cell volume (Hct) levels are often used to monitor iron status. The Hgb levels in veal calves at birth ranged from 11.0 to 14.0 g/dl in studies by Bremner and Dalgarno (1973a,b), and at 1 wk of age, McFarlane et al. (1988) concluded that Hgb averaged between 9.0 and 10.0 g/dl. Vermeire and Henning (2002) reported the Hgb in veal calves upon arrival at the veal farm ranged from 5.6 to 17.4 g/dl. It is normal for Hgb levels to fall after birth (Bremner and Dalgarno, 1973a; Bremner et al., 1976; McFarlane et al., 1988). This probably occurs as the calf destroys fetal Hgb and begins to produce adult Hgb.

McFarlane et al. (1988) found that although feeding regime influenced Hgb levels, there were no effects on animal health or performance. Vermeire and Henning (2002) reported that blood variables related to iron status were not predictive of animal performance or carcass weight, length, or longissimus area.

According to Wilson et al. (1994), Hgb levels in healthy calves should be maintained between 7.5 and 8.5 g/dl. Egan et al. (1993) found that Hgb levels in veal calves averaged 8.04 g/dl. In a study of California veal operations conducted by Stull and McMartin (1992), calves were classified as marginally anemic (no adverse affects on health, performance, well being) when Hgb levels were between 7.0 and 7.9 g/dl. Clinical anemia was thought to occur when blood Hgb levels fell below 7.0 g/dl; however, there were no detrimental production or health effects observed in any of the calves. Similarly, Roy et al. (1964) and Bremner et al. (1976) indicated 7.0 g/dl as the point below which feed intake and growth are affected. The term “clinical anemia” is not appropriate for blood values of 7.0 g/dl because “clinical,” by definition, requires visible “clinical” signs. Veal industry experts consider calves with blood Hgb values of 5.0 to 7.0 g/dl to be marginally iron deficient. McFarlane et al. (1988) found that even when Hgb levels in calves averaged between 5.5 and 7.0 g/dl, health and performance were not compromised when compared with calves receiving more iron. Stull and McMartin (1992) found similar results in their survey of California veal operations. At market size, 25% of veal calves had blood Hgb in the range of 7.0 to 7.9 g/dl, and 10% had blood Hgb <7.0 g/dl. None exhibited visible signs of anemia.

At birth, calves have differing amounts of iron stores in the liver (Gooneratne and Christensen, 1989; Miltenburg et al., 1991). In modern veal farms, veal calf health is monitored regularly for Hgb, Hct, and red and white blood cell counts. Based on the results of these tests, iron injections are used to supplement a veal calf’s diet, especially early in the production cycle. However, iron injections may cause muscle blemishes (George et al., 1995), and more oral supplementation is used later in the production cycle.

Proposed legislation mandates that sufficient iron be present in the diet to prevent anemia and maintain good health and vigor. Appetite and growth rate can be maintained while preventing anemia with either injections or iron supplementation in the range of 25 to 40 mg/kg of dry diet (Webster et al., 1975; Bremner et al., 1976; Davis and Drackley, 1998).

Digestible Fiber. At birth, calves, similar to all mammals, are milk digesters. Milk bypasses the rumen through the esophageal groove and enters the abomasum directly, where digestion occurs. Calves are born without a functional rumen and are unable to digest fiber (Huber et al., 1961a,b). Research has shown that veal calves fed fiber before the rumen is developed may suffer digestive disorders, diarrhea, and a general reduction in health and well being (Matiello et al., 2002; Van Putten, 1982; Welchman and Baust, 1987; Wensing et al., 1986; Wilson et al., 1994).

Although young beef calves consume grass on pasture (grass is actually low in fiber and high in soluble
sugars) and eventually develop a functioning rumen, they do not consume fibrous forages such as hay or straw as early as 14 d of age. Beef calves are not generally weaned before 6 mo of age. They reach weaning age while still consuming a diet mostly composed of milk, while their mothers graze on grass. Grass intake supplements mother's milk consumption as calves grow. Grasses are high in carbohydrates and soluble sugars, not in digestible fiber, which helps to initiate rumen development.

It is unclear what the legislation authors mean by the term “digestible fiber.” The term fiber refers to a variety of plant cell-wall components including cellulose, hemicellulose, lignin, pectin, silica, etc. (Goering and Van Soest, 1970). These are usually found in hay, straw, and other forages. A calf cannot digest fiber. Newborn calves have a digestive system that is similar to other newborn mammals. Feed fiber would not be fed to a newborn human; therefore, feeding fiber to a young calf is questionable.

Calves are made to digest milk early in life. When fed too much high fiber feed prior to rumen development, they will not grow well and may not develop normally. They will not gain BW, will become unthrifty, or both. If milk intake is limited and dry feed (grain) is fed, then rumen development will take place as normal microbial fermentation begins. Dairy calves that are raised as milk herd replacements begin consuming concentrate feeds (grain) that are low in fiber at several weeks of age; when milk intake is restricted, rumen development occurs. This development in a dairy heifer is premature when compared with either a veal calf or a beef calf that may not be weaned until 6 to 9 mo of age.

When fiber is fed to young pre-ruminant calves, abnormal conditions can result. Calf health and welfare may be compromised. Work by Van Putten (1982), Wensing et al. (1986), Welchman and Baust (1987), Wilson et al. (1994), and Matiello et al. (2002) indicate that veal calves fed straw or other high fiber feeds had increased abomasal lesions, ulcerations, or both. In research studies by Wensing et al. (1986), the feeding of corn silage, straw, and alfalfa all resulted in increased incidence and severity of abomasal lesions with the greatest increase in calves fed pellets made with corn silage or straw. Wiepkema et al. (1987) and Morisse et al. (2000) reported some susceptibility to lesions and ulcerations regardless of the type of diet fed. Matiello et al. (2002) concluded that the incidence of lesions was increased by the provision of solid feeds, particularly from structured fiber sources, and concluded that there was no benefit from added fiber. Those researchers stated that the solid feedable to meet a calf's behavioral needs and to improve digestive processes of veal calves without damaging the digestive apparatus is still to be identified” (Matiello et al., 2002).

Proposed legislation requires the feeding of “digestible fiber” at 14 d following birth. This is contraindicated for a variety of reasons. First, feeding fiber at this early date will compromise calf health and well being. Abomasal ulcers are a clearly documented phenomena resulting from feeding supplemental fiber to young pre-ruminant calves. Fiber, in the form of hay, straw, or silage, should not be fed to calves until after weaning and only when rumen development has occurred. Second, the feeding of fiber in the form of hay or straw may result in calves that are undernourished and unhealthy. This will result because their underdeveloped rumen cannot yet digest fiber. This affects their overall development, slows their growth rate, and may result in impaired health. Third, if calves are to be fed dry feed at all, it should be a calf concentrate or calf starter. These feeds are primarily composed of fermentable carbohydrates, such as starches and sugars from feeds such as corn, oats, molasses, and soybean meal. They are highly digestible, have little fiber, and will aid the calf as it grows and begins the process of rumen development. Much research (Davis and Drackley, 1998) has determined that the best way to develop the calf rumen in young calves is to feed a small amount of calf starter (grain) to initiate the bacterial fermentations that take place and cause rumen development. Feeding fiber in the form of hay or straw may have a deleterious effect—the opposite result it was intended to achieve. Finally, veal calves fed only milk or milk replacer will be just as healthy and usually gain more BW than calves fed grain and pelleted concentrate feeds. In fact, during the first 4 to 5 mo of age, milk-fed veal calves may gain more BW than their grain-fed counterparts because milk is a more concentrated, complete, and balanced source of nutrition and because ruminant digestion (fermentation) is less efficient than pre-ruminant (direct) digestion.

It is difficult to agree upon the factors that influence animal well being. According to Schwartz (1990), there are four indicators of well being (productivity, pathological changes, physiologic or biochemical changes, and behavioral changes). Many scientists believe that productivity is a good indicator of animal well being. By this definition, veal calf production not only results in a quality product for marketing to consumers, it provides for superior animal well being. There are a variety of Quality Assurance Programs (dairy, beef, lamb, pork, and chicken) in place to ensure optimum product quality to the consumer while maintaining excellent animal care, health, and well being. According to the Cattlemen’s Beef Board (Cattlemen’s Beef Promotion and Research Board, 2002), 71.7% of commercial veal producers participated in the national Veal Quality Assurance Program in 2002. These standards promote optimal calf health, performance, well being, and market-ability of the resulting product.

Implications

According to scientific studies and evaluation of existing production
practices, calves raised on veal farms are well cared for and have their nutrition and health needs met. The legislative issues discussed in this paper included a ban on tethering, mandating the feeding of iron supplements after birth, and requiring the feeding of “digestible fiber” beginning at 14 d of age. These are all contraindicated for optimal veal calf health. Tether systems are not stressful, and are beneficial for veal calves as shown repeatedly by both university research and practical observation. Iron levels are maintained above minimum levels on veal farms to assure adequate health and performance while meeting consumer demands. Digestible fiber is not recommended for veal calves because of well-documented health requirements. All of the proposed legislation (New Jersey, California, and Illinois) has currently been defeated or stalled; however, it has already been re-introduced into the New Jersey legislature (New Jersey State Legislature, 2004). These kinds of measures may bring about more significant, but not necessarily animal-friendly, measures in the management of domestic livestock.


