



Bedding Options for Dairy Cattle

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Abstract

Bedding is important for maintaining the comfort of the animal. It must offer uniform support to the animal. The bedding materials can be categorized as organic and inorganic bedding materials. The organic bedding materials include sawdust, wood shavings and paper based bedding materials. The inorganic bedding materials include sand, gypsum, straw and limestone. The recent innovations in bedding materials includes geotextile mattresses, cow waterbeds and cow stall mats. The bedding materials be non- abrasive and should be economical to the farmer. It should be cost and labour efficient.

Keywords: Organic bedding materials, Inorganic bedding materials, Geotextile mattresses, Cow waterbeds

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1. INTRODUCTION

The bedding plays an important role in all dairy operations. The best bedding choice will depend on the type of housing used, as well as local cost and availability of different bedding products. The different types of bedding materials could be chosen taking into consideration the animals comfort and the economic status of the farmer. Because cows are large animals, bedding should offer uniform support. It must be comfortable to lie on and provide coolness in summer and warmth in winter. Dry bedding is important both for comfort and for reduction in growth of pathogens. Nonabrasive bedding provides comfort and reduction in the injury to the animals. In addition, it is cost and labor efficient.

Table 1. Different types of bedding materials

Organic bedding materials	Sawdust
	Wood shavings
	Paper based bedding materials
Inorganic bedding materials	Straw
	Sand
	Limestone
	Gypsum

The organic bedding materials are readily available and absorbs moisture. They are compatible with manure handling systems.

2. ORGANIC BEDDING MATERIALS

2.1 Sawdust and wood shavings

Sawdust and Wood shavings are probably the most commonly used bedding products for dairy cows. They have the advantage over sand of being broken down by microorganisms in the disposal system, but they allow growth of microorganisms (pathogens). Addition of lime to bedding may reduce growth of pathogens. The smaller particle size of sawdust makes it more absorbent than wood shavings and quicker to break down. However, small particle size is also associated with rapid growth of bacteria and other harmful pathogens (1). Cost and availability tend to be deciding factors in choice of material. Sawdust can be a highly variable material, but when screened and dried, it provides an effective bedding material when managed properly. Unscreened materials are unsuitable as they may contain shards of wood and even nails and are likely to be very variable. Damp sawdust is an excellent medium for supporting many pathogens so it is essential to keep sawdust dry in storage; well-managed sawdust-based systems can give excellent results but when badly-managed there is considerable potential for problems to occur.

2.2 Paper-based bedding materials

A variety of paper-based products are used for livestock bedding, including shredded waste paper, paper pulp and specially-designed proprietary granulated bedding products. Specially-designed granulated materials can possess excellent characteristics that make them suitable as dairy cow bedding. The latent alkalinity of some paper-based products also has a disinfectant effect and can help to control pathogens. Paper pulp can set hard, and produce an undesirable uneven surface. When wet it can heat-up to provide good conditions for pathogens to flourish. Shredded paper is not widely used on farms as it is not particularly absorbent, and cattle can appear dirty.

2.3 Straw

Chopped straw is a widely-used bedding material for cow housing, and when clean, dry, well-stored straw is used and managed correctly it can provide a comfortable environment for cattle bedding. However, where straw beds are allowed to become heavily soiled, particularly in deep-bedded yards, the bedding has the potential for becoming an effective medium for pathogens responsible for causing infectious foot problems. It composts well and reduces in volume when composted, better than sawdust or wood shavings. It is important when using straw as bedding that the particle size be small, preferably fitting through a $\frac{3}{4}$ inch screen, both to increase animal comfort and to shorten breakdown time (2). Bedding absorbency as well as comfort to animals varies according to the species as well as to the chop size.

3. INORGANIC BEDDING MATERIALS

3.1 Sand

Sand can be a good choice of bedding. Depth of 6-8 inches in a tie stall or free stall barn is recommended (3). Because sand is an inert material, it will not tend to promote growth of pathogens, though when mixed with manure, the manure will support pathogen growth. Particle size is of great importance. Too small particle size (or too much organic matter mixed in) will hold water too well. Large particles ($> 3\text{mm}$) will not be comfortable to lie on. Sand which is naturally occurring will have more rounded edges and be more comfortable as bedding than manufactured sand which comes from crushing rock. The potentially negative side of using sand as bedding is its disposal. In a liquid manure handling facility, sand must be settled out and disposed of. In this way we can reuse the clean sand.

3.2 Lime

Lime is used sparingly with other bedding materials. It has the potential to dry-out and damage teat and udder skin and so must be adequately covered with chopped straw or sawdust, but is very useful in drying-out soiled wet patches on cubicle beds and controlling bacterial levels.

3.3 Manure compost bedding

Manure compost bedding is another option. It is a renewable source that is readily available in large quantities and can be used liberally in free stalls. Undigested pieces of feed fibres can be separated from dairy manure and used for bedding. Use the bedding soon after processing and apply it several times per week to avoid reheating in the stalls. When the bedding becomes wet or soiled, scrape off the manure and bedding and replace it with clean compost bedding.

4. RECENT INNOVATIONS

One of the recent innovation in bedding are Geotextile Mattresses. They are manufactured from a variety of materials that are commercially available. These may be used in either tie stall or free stall barns. These have waterproof exteriors, and are filled with a variety of materials including rubber crumbs, polyethylene foam, and water (4). They are marketed as requiring no bedding, but research has shown that added bedding makes the mattresses much more attractive to cows. Mattresses are generally installed in rows, attached to one another, and come in a variety of sizes to fit typical stall sizes (5).

Cow stall mats is another innovation. They are normally constructed of a 1.9 to 2.5 centimetre ($\frac{3}{4}$ to 1 inch) thick industrial grade solid rubber or a multi-layered vinyl. Because of their solid nature they offer the least improvement for cow comfort over a concrete base covered with bedding. However, these mats do provide a non-abrasive, non-skid surface that adds traction for cows, is impervious to water, bacteria and mold, while offering low maintenance and reduced bedding requirements. Stall mats properly

installed on a sloped surface facilitate drainage of fluids keeping the cows drier. In addition, the mat offers a layer of insulation between the cold concrete stall base and the cow during winter temperature conditions. Stall matting is available in an individual mat or a continuous roll configuration (6). Individual mats can be utilized in tiestall barns with in-floor stall dividers with continuous mats lending themselves come in a range of sizes to fit standard sized cow stalls with some manufactures offering custom sized mats to fit non-standard sized stalls. The continuous roll design can cover a number of stalls with a single piece of matting reducing the number of seams. However, if an area of matting becomes damaged the individual mat configuration offers an easier repair via mat replacement whereas; the continuous mat requires a larger area to be replaced. The rubber mats are environmentally friendly. The bed also moves with the cow's skin, protecting her from abrasions. Both of these factors help minimize bacterial build up that might introduce mastitis-causing bacteria. While an added labour cost, many producers may also dust beds with a handful of sawdust or powdered lime once or twice per day.

Cow mattress consists of an exterior envelope made of either synthetic materials or rubber, filled with an inner core of crumbled rubber, gel or water. In addition to the benefits of solid mats described above, mattresses tend to be much thicker than mats thus offering additional cow comfort. Mattresses filled with crumbled rubber often become firmer with time due to the compaction of the particle core. To overcome the compaction issue gel-mats have been developed where the core is made up of multiple compartments filled with a gel substance instead of a crumbled rubber. These mattresses are purported to remain softer for much longer periods as well as reducing pressure points on the cow's contact points with the mattress. Alternately, dual chambered mattresses filled with water, commonly referred to as cow waterbeds, have become more popular in recent years due to low incidence of hock joint abrasion, minimal bedding needs and the prolonged life of the mattress. One water filled chamber of the mattress cushions the front of the cow while a rear chamber supports the rear weight of the animal. It is important that the stall surface over which the stall base is installed is adequately sloped to the rear to facilitate drainage of fluids off the base material.

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