

The Use of Wood Shavings and Sawdust as Bedding and Litter for Small Pet Mammals
in Colorado.

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1.0 Introduction

A variety of small mammals are reared in captivity as household pets. Small mammals raised as pets include hamsters, gerbils, mice, rats, guinea pigs, rabbits, and ferrets. Bedding and litter products are typically required to adequately care for small mammals in captivity. A variety of natural materials are used as bedding and litters for small mammals. These include cedar, pine, pine with chlorophyll added, aspen, natural fiber pellets, corn cobs, and walnut bedding. This report will focus on wood products used for small mammal bedding and litter.

1.1 Objectives

The objective of this paper is to assess the suitability of wood as bedding and litter for small pet mammals, determine the potential for consumption of wood bedding and litter, and provide recommendations for increasing the use of wood from Colorado forests for bedding and litter products.

1.2 Scope of Research

In this report the types of small mammals owned as pets in Colorado are identified. The demographics of small pet ownership in Colorado are presented, along with current recommendations for bedding and litter products, and a discussion of the suitability of wood shavings and sawdust as bedding. The potential Colorado market for bedding and litter is examined, along with a discussion of the

availability of wood bedding and litter, including cedar, pine, and aspen products. The market potential of these products is evaluated. A discussion of alternatives to existing products is discussed, including aspen, cottonwood, and less aromatic softwoods.

2.0 Types of Small Mammals Owned as Pets in Colorado

A variety of small mammals are owned as pets in Colorado. Mammals considered in this research include rabbits, guinea pigs, ferrets, hamsters, gerbils, and other rodents, including rats and mice. Included in this section is a discussion of pet demographics, recommended bedding and litter for small mammals, and a brief discussion of the suitability of wood shavings and sawdust as bedding.

2.1 Demographics of Small Mammal (Pet) Ownership in Colorado

The demographics of small mammal (pet) ownership are presented in Table 1. The estimated number of households in Colorado that own small mammals was derived from a national survey of pet ownership (2) which was prorated for Colorado based on U.S. Census data. In 1996, pet population estimates indicated that rabbits (estimated population of more than 75,000) were the most popular pet, followed by hamsters (population 28,500). Guinea Pigs, ferrets, gerbils (numbering 16,600, 12,000, and 11,600) also represent significant populations. Other small rodents, including rats and mice, are less popular (population 16,000).

Table 1. 1996 Colorado Small Mammal (Pet) Ownership

The Number of Pets per Pet-owning Household, the Number of Colorado Households Owning Pets, and Pet Population Estimates.

Type of Pet	*Number of Pets per Household -	**Number of Households (1,000)	Estimated 1996 Pet Populations (1,000)
Rabbits	2.63	28.5	75.1
Guinea Pigs	1.87	8.9	16.6
Ferrets	2.00	6.0	12.0
Hamsters	1.86	15.3	28.5
Gerbils	2.76	4.2	11.6
Other Rodents	2.42	6.6	16.0

*Based on national survey data for pet ownership (1).

** Based on national survey data for pet ownership (1) prorated to Colorado using U.S. Census data (3).

2.2 Recommended Bedding for Small Mammal a

While there are pet suppliers and owners that do not recommend wood shavings and sawdust (particularly cedar and to a lesser extent pine) for small mammal bedding under any circumstance, wood bedding is generally considered acceptable when manufacturer recommendations are followed. Recommendations for the suitability of wood bedding and litter products are presented in Table 2. With the exception of ferrets, pine is generally favored over cedar. Chlorophyll pine does not offer significant advantage compared to ordinary pine bedding. Aspen is considered superior to both cedar and pine.

2.3 Suitability of Wood Shavings and Sawdust as Bedding

Generally, neither cedar nor pine bedding products are normally used for research animals. This is because these woods emit aromatic hydrocarbons that can contribute to a variety of respiratory diseases in small mammals (4). This is particularly true for small mammals housed in relatively small enclosures with poor ventilation. The warm, moist conditions typically found in these enclosures enhance the aromatic properties of the wood. Therefore, less aromatic woods such as aspen are preferred. In addition, aspen is desirable because it has a relatively low density and good absorbency properties.

In response to health issues, pine bedding manufacturers have tried to improve their products.

Table 2. Recommended Usage Chart for Wood Bedding & Litter Products.

Type of Pet	Cedar	Pine	Chlorophyll Pine	Aspen
Rabbits	NR-S	NR-S	NR	NR-G
Guinea Pigs	NR	MR - G	NR - S	G
Ferrets	NR - G	NR - S	NR - S	NR - G
Hamsters	NR	NR - G	NR - S	G
Gerbils	NR - S	NR - G	NR - G	G
Other Rodents	NR	NR - S	NR - S	G

Notes: 1. NR -S -G -
Note Recommended, Satisfactory Good

2. Recommendations often ranged considerably and this is reflected in notations. For example, ~NR - G” means that recommendations varied from not recommended to good.

Chlorophyll has been added to pine bedding. However, the benefits of adding chlorophyll appear minimal. There are kiln dried pine bedding products on the market which are promoted as being a safer product, claiming that kiln drying removes aromatic hydrocarbons from the wood. While it is possible that some aromatic hydrocarbons are removed during the drying process, when the wood is exposed to moisture it will tend to become aromatic again. Nonetheless, all pet care instructions evaluated in this research recommended changing bedding and litter often. Changing bedding at least once a week is recommended for mammals such as hamsters, gerbils, mice, and rats. Twice a week is recommended for guinea pigs and rabbits, and three times a week for ferrets. This helps reduce problems associated with odor.

3.0 Bedding Market for Small Mammals (Pets)

A survey of small animal owners, revealed that a high percentage (86 percent in 1996) purchase litter and bedding products (1). This rate varies depending on the pet type. For example, 97 percent of hamster owners purchased litter and bedding products in 1996, while only 78 percent of rabbit owners did. Table 3 lists outlets shopped for small animal bedding. In 1996, 45 percent of bedding and litter products were purchased at discount stores. Another 31 percent were purchased pet stores and pet superstores. The remainder was purchase at hardware/garden/feed stores (21)

Table 3. Outlets Shopped for Small Animal Bedding & Litter Products.

Outlet	*Percent
Discount Store	45
Hardware/Garden/Feed	21.
Pet Store	19
Pet Supers tore	12
Grocery Store	6

* Notes:

1. Percentages based on surveys of pet owners (1).
2. Percentages exceed 100 percent because of rounding errors.

percent) and grocery stores (6 percent). These figures exceed 100 percent due to rounding errors.

3.1 Availability and Price of Wood Bedding

Manufacturers supplying local outlets are primarily located in the East North Central Region, including Michigan, Ohio, and Wisconsin. Bedding and litter is typically marketed in bags, commonly 1500 cubic inches and 5 cubic feet in size. Smaller sized bags (down to 500 cubic inches) and considerably larger sizes (up to and in excess of 10 cubic feet) are available at some outlets. The majority of bedding products are compressed, primarily to reduce shipping costs. However, uncompressed bedding and litter products are available at some outlets. The retail market is currently dominated by cedar and pine bedding and litter products. Aspen bedding was not available locally in retail outlets.

3.1.1 Cedar Bedding

Cedar bedding is available at most outlets. The price currently ranges from \$2.50 to \$3.50 for 1500 cubic inches of bedding purchased from discount stores or large pet stores and superstores. The price for 5 cubic feet was typically \$5.00 to \$6.00. Observed prices were generally higher at smaller outlets, ranging up to \$5.00 for 1500 cubic inches and \$8.00 for 5 cubic feet.

3.1.2 Pine Bedding

Pine bedding was readily available at all outlets selling animal bedding. Pricing for ordinary pine bedding and litter is comparable to that for cedar. Chlorophyll pine was considerably more expensive ranging from around \$3.00 to \$4.00 for 700 cubic inches at discount stores to more than \$10.00 for 1500 cubic inches at several smaller outlets. Bedding manufactured from kiln dried pine also sells at premium, around \$5.00 to \$6.00 for 1500 cubic inches at discount stores and pet superstores.

3.1.3 Aspen

Although aspen bedding and litter is used extensively in research (4), no aspen products were found in local (Fort Collins) retail stores selling pet bedding. At Colorado State University, aspen shavings and chips are purchased primarily from out-of-state in bulk quantities (typically packaged in 30 to 40 pound bags). Prices paid for aspen shavings and chips run from \$6.00 to \$8.00 per bag when purchased in truckload quantities and \$7.00 to \$9.00 per bag for lesser amounts.

3.2 Market Potential

Table 4 gives an estimate of pet bedding and litter consumption for Colorado during 1996. This estimate is based on manufacturers and pet care guidelines. The potential consumption of bedding and litter products is 7.6 million cubic feet. The majority of this consumption was

Table 4. Potential 1996 Consumption of Wood for Small Mammal Bedding and Litter in Colorado.

Type of Pet	Estimated 1996 Pet Populations (1,000)	Estimated Bedding per Change (cu.ft.)	Change Frequency per Year	*Estimated Bedding per Year (m cu.ft.)
Rabbits	75.1	0.75	104	4,569
Guinea Pigs	16.6	0.75	104	1,178
Ferrets	12.0	0.75	156	1,207
Hamsters	28.5	0.25	52	360
Gerbils	11.6	0.25	52	130
Other Rodents	16.0	0.25	52	179
				7,624
*potential 1996 Consumption				

* Calculated as follows:

$$\text{Estimated Bedding Per Year} = C2 * C3 * C4 * MF$$

Where:

C2 = 1996 Pet Population

C3 = Estimated Bedding per Change

C4 = Change Frequency per Year

MF = Market Factor (Percentage of pet owners that purchase bedding and litter products)

MF (Rabbits) = 0.78

MF (Guinea Pigs) = 0.91

MF (Hamsters) = 0.97

An average MF of 0.86 was used for other mammals considered in this study.

** This value is considered a potential value because pet owners can buy bedding and litter products comprised of materials other than wood.

pine and cedar products. However, with regards to wood, the estimated consumption is a potential value because bedding and litter products comprised of materials other than wood are available on the market.

4.0 Potential Alternatives to Existing Products

Cedar and pine shavings dominate the market for wood bedding and litter. Because these woods contain aromatic hydrocarbons that can contribute to a variety of respiratory ailments in small mammals, less aromatic wood species are desirable. One alternative wood is aspen. Other possibilities include cottonwood and less aromatic softwoods.

4.1 Aspen

Aspen shavings are considered an excellent choice of bedding and litter for all varieties of small mammals typically owned as pets. Aspen bedding is generally considered superior to both cedar and pine products. Aspen does not have a distinct odor. In addition, it has a low density and good absorbency properties. Curiously, while aspen is the bedding and litter of choice for research animals, this wood is not readily available in retail pet stores. Although the reason for this is uncertain, cost and lack of available resource probably account for this phenomenon. Aspen shavings and chips are desirable for a variety of products, including OSB and pulpwood, which bring

a higher price than animal bedding and litter. However, if properly marketed and promoted, an aspen product could penetrate this market.

In the retail market, an aspen bedding and litter product could be sold in bags, either compressed or uncompressed, in sizes comparable to those used for pine and cedar. To be price competitive 1500 cubic inches of aspen bedding would have to sell for a retail price of approximately \$3.00 retail. Five cubic feet would need to sell at a retail price in the range of \$5.00 to \$6.00. However, because aspen is generally considered more desirable, it is possible that aspen could sell at a premium to both cedar and pine with effective marketing. If an economical, stable supply of aspen were available, there is potential for using it as small mammal bedding and litter.

4.2 Other Less Aromatic Woods

Alternatives to cedar and pine bedding and litter products might be cottonwood or less aromatic softwoods such as fir and spruce. Cottonwood has properties similar to aspen. The wood of spruce and fir species are relatively low in density without characteristic taste or odor. These desirable characteristics potentially make these wood species suitable for small mammal bedding and litter. However, further research is required to determine if these species are safer than cedar and pine products.

5.0 Summary and Conclusions

The retail market for small mammal (pet) wood bedding and litter is currently dominated by pine and cedar products. However, both of these wood types contain aromatic hydrocarbons which can be harmful to small mammals. Even though it is considered superior from an animal health standpoint to both pine and cedar, aspen bedding is not currently available in local outlets. Given an economic stable supply of aspen, there is potential for aspen bedding to penetrate this market and perhaps sell at a premium. There may also be potential for cottonwood and less aromatic softwoods such as fir and spruce to penetrate this market as well, but research is necessary to determine the suitability of these wood species for small animal bedding and litter.

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