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Using Chopped Newspaper for Animal Bedding

Scott Gunderson, Greg Wise, John Roach and Dave Muench



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For generations farmers have used a handful of products for bedding their livestock: among them, straw, sawdust, corn stalks and sand.

Use of chopped newspaper as animal bedding is on the increase.

Newspaper has been chopped and used for animal bedding on a limited scale for several decades. Now with landfill disposal bans and studies showing newspaper bedding to be safe and non-toxic, it's use as a bedding source is expected to increase.

Benefits of Chopped Newspaper Bedding

Newspaper has unique features which make it attractive for use as animal bedding. As animal bedding, newspaper is:

- Easily available.
- Cost competitive with traditional bedding materials.
- Suitable for all livestock.
- Highly absorbent and long lasting.
- Sterile, dust-free, and weed-free.
- Rapidly decomposed in soil.
- Easily transported by conventional manure handling systems.

In addition, using newspaper instead of straw frees up land which can be used to grow other crops. These and other newspaper properties will be analyzed in detail in this bulletin.

AVAILABILITY AND PROCESSING

Paper is readily available through family, neighbors, and paper drives. Community recycling programs and commercial paper brokers provide another source of even larger supplies. As the demand for paper increases, supplies become more scarce and, of course, the price increases. Since 1991, prices have been \$0 – \$2 per ton but rose as high as \$45 per ton in 1988.

According to a 1990 *Recycle World* report, each person generates .19 pounds of newspaper per day. At that rate a community of 10,000 would generate 345 tons of newspaper annually. Actual paper availability is not at the 100 percent level, but with state mandates on recycling and a resurgence of environmentalism, availability rates are expected to increase.

How To Get Newspaper Bedding

There are two ways farmers can procure paper bedding – purchase it ready-made or chop their own raw paper on the farm. Paper bedding can be purchased from some municipal recycling centers or private paper recyclers already chopped and baled. Currently, however, there are only a few places where ready-made paper bedding is available.

Processing Methods For Newspaper Bedding

Commercial Processing. Newspaper bedding available from commercial vendors is often processed into bales. The size of the bale becomes important from an on-farm handling standpoint. Bales generally come in two sizes: a 40 – 70 pound bale (similar to a hay bale) and an 800– 1000 pound bale produced by a commercial baler. For in-barn use the smaller size is easier to handle. Large bales, however, are more desirable in a bedded pack and can be handled with a front-end loader.

One also needs to consider the type of cut from commercial processors. Some industrial type shredders used in recycling operations produce strips 1/2-inch wide and the length of the material being processed. Long strips tend to entangle the animal's feet, causing it to be moved out of the stall. Choppers with crosscut mechanisms solve this problem.

On-Farm Processing. Farmers can process bedding using equipment many already have at their disposal, including bale choppers, tub grinders, and forage harvesters. Bedding choppers are easiest to use and need no alteration; however, there are some manufacturers which feature optional knives specifically for chopping paper. Gasoline engine-powered bedding choppers should have a minimum of 11 — 12 horsepower. Newspaper is loaded into the tub and the operator maneuvers the bedding chopper to direct the material into the stall. With stationary units, paper is chopped into piles to be moved around by hand. Tub grinders are larger versions of bale choppers. Both produce 1 – 2-inch squares or chunks of paper.

Farmers can chop newspaper for bedding using equipment many already have at their disposal.

Wood chippers can also be used to chop newspaper. These small and relatively inexpensive units produce a cut similar to a bedding chopper, but at greater volumes. Therefore they may be more appropriate in a small industrial operation.

Forage choppers work well for chopping newspaper. To achieve a proper cut and to operate the equipment safely, the hay head should be replaced with a corn or feed chute. A recutter screen maybe needed to produce the desired length cut. A six-knife model without a screen produces long, irregular cuts.

With the addition of a 3-inch screen, a 3 – 6-inch cut was achieved. Models featuring more knives (8 or 12) may need no screen, depending on the cut produced. Most types of forage harvesters will work. When used with a minimum recommended 100 horsepower tractor, output will approach 2000 to 2500 pounds per hour.

Chopped paper can be baled for storage or for transport using a regular hay baler. The bale produced is of normal size, but weighs 40 – 70 pounds. The chopped paper needs to be fed into the baler at a uniform rate to avoid overloading and the string tension should be monitored closely.

IMPACT ON DAIRY HERD HEALTH

Bacteria that cause mastitis can be divided into two groups: contagious pathogens and environmental pathogens. Environmental pathogens are derived from the environment in which the animal lives, whereas contagious mastitis is transmitted from one infected cow to another.

Because of their close proximity to the udder, bedding materials are a significant source of teat-end exposure to environmental pathogens. Rates of intramammary infections are correlated with the number of mastitis-causing pathogens on the teat end. Organic bedding sources frequently contain high coliform and environmental streptococcal numbers.

Mastitis Organism Growth In Newspaper

Dairy producers have traditionally used straw, wood shavings, sawdust, and other organic materials to bed cows. As with any organic bedding, the prevalence of environmental pathogens in the bedding is of concern.

University studies and on-farm demonstrations have indicated that chopped newspaper does not harbor any more environmental organisms than other commonly used bedding materials. In fact, Pennsylvania researchers reported that the growth of coliforms (*E. coli* and *K. pneumoniae*) was significantly less in dairy stalls bedded with newspaper versus stalls bedded with sawdust. Growth of *Streptococcus* species, however, was similar for chopped newspaper and sawdust. Other university studies also demonstrated that bacterial counts in chopped newspaper were approximately equal to other organic materials.

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Although chopped newspaper has been shown to be an effective livestock bedding, management practices need to be as vigilant with newspaper as with any other bedding. It is imperative that any bedding source be clean and dry. Completely replacing the chopped newspaper in the back one-third of the stall every 24 hours is recommended. Depending upon the cleanliness of the newspaper, the amount of moisture present, and the temperature, more frequent replacement of the bedding may be required.

Newspaper Bedding And Toxicity Potential

The potential for animal health contamination, as a result of substances found in the ink used in newspaper, has been addressed. Since 1985, the levels of heavy metals and other contaminants have been significantly reduced in newspaper. According to the American Newspaper Publishers Association (ANPA) more than 98 percent of the daily newspapers in the United States currently use inks that are low in toxicity. While there have been no known cases of milk contamination from newspaper residues coming in contact with the udder, additional research is required to address this issue.

Even when cows were fed pelletized newspaper at rates up to 10 percent of their total dry matter intake, milk and meat showed no adverse effects.

Research at Cornell University concluded that the use of chopped newspaper as bedding for dairy cattle has a “negligible risk.” Even when cows were fed pelletized newspaper at rates up to 10 percent of their total dry matter intake, no adverse effects were seen in milk or meat. No significant levels of toxic substances were found in the milk from cows consuming newspaper. In addition, no animal health or milk quality problems were found in Penn State bedding trials or in feeding studies when newspaper was consumed by dairy cows at levels of 1.8 or 2.4 pounds per head daily.

Colored inserts contain higher levels of contaminants than black and white newspaper. Since animals may voluntarily consume some newspaper when it is used for bedding, it is not recommended to bed dairy animals with colored “slicks” from advertising inserts, catalogs, or magazines.

ECONOMICS AND HANDLING

Several university trials with dairy and beef cattle, horses, and poultry, comparing newspaper to traditional bedding sources have shown some distinct advantages of newspaper. It is also recognized as a suitable bedding for small animals and pets.

Newspaper Utilization Rates

Research completed in Outagamie and Manitowoc Counties (Wisconsin) confirms other work that suggests that lactating cows, in both stanchion and freestall environments, require 2 – 3 pounds of chopped newspaper per cow per day. This represents a reduction in bedding of between 20 — 35 percent when compared to traditional bedding sources. Approximately the same reduction can be expected when newspaper replaces traditional bedding in maternity pens and bedded packs.

Lactating cows, in both stanchion and freestall environments, require 2 – 3 pounds of chopped newspaper per cow per day.

The data in Table 1 show the bedding usage that occurred in a field trial at an 84-stall dairy. The barn in this study contained an open gutter. In order to adequately line the gutter, a volume of paper equal to that required by a stall was used. The usage amount listed for stalls in Tables 1 and 2 reflect the amount of chopped paper used in both the stall and the gutter.

	Straw	Newspaper
Stall	3.2	2.6
BoxStall	41.5	25.6

Notes: Both straw and newspaper were chopped. Stall amounts for both newspaper and straw reflect the amounts used to bed the stalls and line the gutter. Outagamie County data, 1989.

Newspaper's Economic Advantage

It is economically feasible to substitute newspaper for traditional bedding materials. The cost advantage to each operation is unique and must be individually determined. The feasibility will depend on a combination of the following factors:

- Yearly availability and cost of traditional bedding.
- Land available and the need for small grains.
- Available covered storage space for bedding.

Cost savings of 67 percent were achieved when straw bedding was replaced with chopped newspaper.

Data from Table 2 indicates a cost advantage of newspaper over straw on an annual basis of \$1,339, representing a 67 percent advantage for newspaper. This analysis is based on \$35 per ton straw and \$15 per ton newspaper. The bedding costs do not include any processing charges or equipment ownership costs.

Table 2. Cost Analysis For Newspaper Versus Straw

	Straw		Newspaper	
	Pounds	Cost	Pounds	Cost
84 Stalls	271.0	\$4.74	215.0	\$1.61
Boxstall	41.5	\$.73	25.6	\$.19
Daily		\$5.47		\$1.80

Notes: Newspaper and straw were both chopped. Outagamie County data, 1989.

Newspaper's Manure Handling Characteristics

Newspaper has performed well in all manure handling systems. There are, however, properties that are unique to each housing and manure handling system.

Newspaper has performed well in all manure handling systems.

Freestalls. Newspaper particle size is critical. Newspaper shredded in long strips (longer than 5 – 8 inches) tends to entangle cattle's feet and be tracked out of the stall. In slatted floor systems, long paper hangs on the slats and prevents manure from passing through into the pit or gutter. For this reason, chopped newspaper is preferable to shredded material.

If stalls are not adequately maintained or insufficiently bedded, a mat of paper and manure will develop and adhere to the rear of the stall platform. For dairy cattle it is recommended that bedding be replaced daily.

Tiestalls or Stanchions. In barns with open gutters, adequate amounts of newspaper will be required in the gutter to absorb liquid wastes necessary to keep tails dry. Sufficient amounts of paper must be used in the gutter to allow manure to travel up manure chute inclines.

Bedded Packs or Loose Housing. In some cases, difficulty cleaning the manure pack has been observed. This problem is minimized if dairy cattle are provided with adequate space and are properly bedded.

Paper does not present any problem for manure handling in liquid or semi-solid systems.

Gravity Flow and Pumped Manure Systems. Newspaper does not cause complications when manure is handled in a liquid or semi-solid state. The movement of newspaper and manure to storage cause the two to become thoroughly mixed. No problems exist when agitating or pumping manure from storage facilities.

Daily Haul. Newspaper and manure become mixed through handling and are usually not identifiable after application to the field.

General Management Comments

Care needs to be used when handling newspaper in the open. Any amount of wind can cause blowing problems in handling processed or unprocessed newspaper. With summer ventilation, newspaper bedding may blow about in stalls. This will be most severe in curtain sidewall type housing or in barns with “wind tunnel” ventilation systems.

Newspaper appears to create less dust than other bedding sources. This is particularly true when compared to straw. This characteristic becomes important from a sanitation perspective in facilities that have an around-the-barn pipeline milking system.

As is the case with most bedding sources, newspaper is flammable. Care should be taken when processing, storing, and using chopped newspaper to prevent a fire.

ENVIRONMENTAL CONSIDERATIONS

Concerns have been raised regarding the environmental soundness of using chopped newspaper for livestock and other animal bedding. Could potentially toxic chemicals pollute land, contaminate groundwater, or pose dangers to human or animal consumption?

Chemical Content In Newspaper

Significant decreases in the use of inks containing heavy metals (particularly lead and cadmium) over the last decade have resulted from changes in publishing technology. Black newspaper ink consists primarily of a treated naphthenic mineral oil vehicle (similar to unused motor oil refined to remove a high percentage of aromatic hydrocarbons) and a black inert carbon pigment. Colored inks are similar, containing one or more pigments. No pigments containing lead, chromium or cadmium are approved for use by the ANPA. Ink manufactured using refined, non-toxic soybean oil is being used by nearly 400 newspapers. Most recently the ANPA introduced a new printing process which uses a water-based ink. And while the paper fiber itself is treated with various chemicals during processing, the chemicals are rinsed and scrubbed out of the final product.

Mixed Manure-Paper Spreading

Soil Conservation Service manuals provide a standard of 30 tons per acre annual application of mixed wastes for fields in corn rotations. Given a typical crop rotation for Wisconsin, three of every seven years would be prepared for corn (spread with manure). A mixture of 4,580 tons of manure-paper bedding could be applied to an acre of land before the lifetime loading limit for copper (the most restrictive heavy metal) was met, assuming that 8.5 percent of mixed waste by weight is paper bedding product. At 30 tons per acre of mixed manure spread three of every seven years, it would take over 356 years of field application before the loading limits for copper were met. Of more immediate concern than lifetime load limits of heavy metals are the annual nitrogen credits that should be considered from manure application.

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Crop Intake

Currently there are no studies showing the direct effect of plant tissue uptake of toxic substances when these crops are planted in fields previously receiving newspaper applications. However, a large amount of data is available regarding crops grown on land treated with municipal sewage sludge. Sewage sludge contains contaminants similar to newspaper, although in even higher concentrations. There is no evidence of adverse effects on humans or animals consuming crops grown on land treated with sewage sludge. It is logical to theorize that plants would respond similarly in land treated with either municipal sewage sludge or the newspaper-manure mixture. In addition, federal agencies, including the Environmental Protection Agency, the Food and Drug Administration and the Department of Agriculture have established guidelines to safeguard the consumer from contaminated crops and damage to the environment.

No problems have been found from consuming crops grown on land treated with sewage sludge which contains similar contaminants, but in higher concentrations than newspaper.

Other Environmental Advantages and Disadvantages

Practical experience has shown that processing, transporting and using dry chopped newspaper can pose a litter problem. The obvious appearance of the paper, particularly in places we aren't accustomed to seeing it, may draw more attention to spillage than that of straw or other alternatives. A method of transportation which enables the load to be enclosed or covered may be required by law.

University of North Carolina researchers pointed to the additional beneficial nature of land spreading a manure-paper mix concluding: "...it (paper) is a basically carbon or organic compound and it ties up nitrogen from animal waste to keep it out of underground water and streams. When placed on cropland, the newsprint releases the nitrogen slowly for use as needed by crops."

SUMMARY

Chopped newspaper has been shown to be a safe, effective, and economical source of bedding material for all types of animals.

Whether purchased at a commercial processing center or chopped on the farm, chopped newspaper for animal bedding has the potential to significantly alleviate solid waste concerns and improve the environment.

References available upon request.

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