

# The Woodchip for Livestock Bedding Project

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Mae'r Proiect Sgiodon Pren ar gyfer Samau Da Byw a gyflenwir gan Hybu Cig Cymru yn derbyn arian cyfatebol gan y Comisiwn Coedwigiaeth, Asiantaeth yr Amgylchedd Cymru a Llywodraeth Cynulliad Cymru fel rhan o Cyswllt Ffermio.

The Woodchip for Livestock Bedding Project ran from December 2005 until May 2008 to evaluate the potential of woodchip as an alternative bedding material to straw for use indoors with sheep and beef cattle.

Straw is currently the most popular bedding material used in Wales and is estimated to cost the Welsh industry £12.5 million every year. As straw costs could potentially rise, farmers are seeking alternative bedding materials and since wood is a local resource in Wales, woodchip is gaining popularity. However, farmers required clear guidance and information on the suitability of woodchip for use as a bedding material and its effect on the health, welfare and performance of the animals as well as the cost of using it. Information on the sourcing of suitable material was also required as was an understanding of the potential uses for woodchip after it has been used as bedding.

The project comprised a series of studies and demonstrations to address the following topics:

- **Woodchip procurement and production**

- Sources of woodchip
- Chipper types
- Wood species
- Optimum moisture content and drying techniques
- Size and shape of woodchips

- **Management systems**

- Type of housing
- Feeding area – scrape clean or feeder on woodchip
- Frequency of bedding
- Depth of bedding
- Effect of animal diets
- Labour requirements

- **Animal health and welfare**

- Health issues e.g. lameness and pneumonia
- Cleanliness of animals
- Performance – weight gain and feed intakes
- Welfare – time spent lying on the woodchip

- **Management of woodchip once it has been used as bedding**

- Composting woodchip bedding
- Options for using the composted material

- **Cost efficiencies**

- Is it cost effective to use woodchip as bedding?
- Is there a market for composted woodchip?

## Project Results

### ➤ **How effective is woodchip as a bedding material?**

Demonstration work undertaken by ADAS-Pwllpeiran, IGER-Aberystwyth and Glynllifon College evaluated the performance of woodchip bedding under cattle and sheep in comparison to straw and found that:

- **A moisture content of less than 30% is critical to maximize the absorbency of the woodchip. It is easier to store and dry wood while it is still in the round as once it has been chipped it is very voluminous and could potentially absorb moisture.**
- **The moisture content of the animal's diets affected the performance of the woodchip bedding with more bedding required for the animals fed a wetter silage based diet. The straw bedding was able to cope with these diet differences much easier.**
- **The health, welfare and cleanliness of the animals were of an equally high standard for animals housed on straw and woodchip.**
- **Woodchip requires mechanical handling and so sheds must be suitable for driving into before considering woodchip.**
- **Woodchip requires dry storage and takes up a lot of space due to its voluminous nature.**
- **The species of wood used had no effect on the performance of the woodchip bedding.**

A full account of this study can be found in [Report 1](#)

### ➤ **Use of woodchip bedding on Demonstration Farms**

Subsequent work on 10 demonstration farms across Wales ([view map](#)) used woodchip bedding alongside similar groups of animals housed on straw and compared the performance of the bedding materials in a commercial farm situation and also determined the comparative costs. Information on each farm can be found on the [Woodchip Bedding Demonstration Farms factsheets](#) and the main conclusions drawn from this stage of the project were that:

- **Woodchip with a moisture content of less than 30% provides a good alternative to straw as a bedding material**
- **At 2006/7 prices, woodchip was more expensive than straw**
- **Recycled wood did provide a cheaper option**
- **Storage and handling facilities for woodchip proved difficult for some farms**
- **Woodchip bedding did not appear to suit finishing lambs**

These results, together with a full account of the health, welfare and performance of the animals can be found in [Report 2](#).

These on-farm demonstrations were not scientific studies so when several farms identified problems with finishing lambs on woodchip further investigations were undertaken by the Institute of Rural Sciences, Aberystwyth University. A short trial measured the food intakes and growth rates of lambs reared on either woodchip or straw bedding and their preferences for bedding material type

were monitored using cameras. **This study concluded that the bedding material had no significant effect on the behaviour of the lambs.** Details of this study can be found in [Report 3](#).

A further study took place at ADAS Pwllpeiran to investigate the effect of bedding material on ewe behaviour. In-lamb ewes were used in the study and observations showed that bedding type had no effect on their behaviour, health and welfare. A full account can be found in [Report 9](#).

#### ➤ **Composting woodchip bedding**

Dealing with straw based manures is well understood but little information was available to help farmers deal with woodchip based manure. This part of the project was carried out by Bangor University and involved a series of demonstrations to illustrate the composting process. These demonstrations involved the material that had been produced at ADAS-Pwllpeiran, IGER-Aberystwyth and Glynllifon College that were described in [Report 1](#). The manures produced were composted at the respective sites under the close supervision of Bangor University and looked at issues such as the site of the compost heaps (indoors or outdoors), the frequency of turning heaps, the addition of other material (e.g. extra manure) to aid composting process and any extra water requirements.

The study concluded that:

- **Woodchip manure heaps should be turned every 4-6 weeks**
- **Extra water may be required due to the high temperatures produced during composting**
- **Composted woodchip manure should not be added to the land until it has fully broken down.**

Full details of the factors affecting the woodchip composting process are described in [Report 4](#) and details of the nutrient value and pathogen content of the samples collected from the Demonstration Farms can be found in [Report 5](#).

#### ➤ **Options for using composted woodchip bedding**

Work was carried out by ADAS-Pwllpeiran and IGER-Aberystwyth to assess the nutrient value of the resulting composts and their potential use as fertilizers/soil conditioners that could be applied to the land. Composted woodchip manures were applied to spring barley and grass plots and their growth compared to plots that had either received no fertilizer, straw based manure and varying rates of chemical fertilizers.

**In all cases the woodchip based manures performed poorest highlighting the importance of not applying woodchip based manure to fields until it has fully composted which may take 2-3 years.**

Further information on this work can be found in [Report 6](#).

#### ➤ **Additional findings**

A short study ([Report 7](#)) was carried out by Bangor University to investigate the performance of woodchip composts that had been composted over several years in comparison to the composts resulting from this project which had only been composted for 6 months. The study was carried out in a greenhouse using pots to grow grass in the selected mediums and concluded that **more mature woodchip composts (i.e. 3 years old) performed better than the immature composts.**

It had also been suggested that woodchip bedding should be sieved after it has been used so that the finer fraction could be used as a growing medium and the coarse fraction could be re-used as bedding. [Report 7](#) illustrates that **there is no commercial merit in sieving woodchip bedding prior to reuse.**

Demonstrations have shown that material can be used for several years before it has broken down sufficiently for use as a soil conditioner. Hence Glynllifon College looked into options for re-using the composted woodchip as bedding again the following winter. **Re-use of composted woodchip bedding was found to be a beneficial way of reducing bedding costs at the same time as increasing the nitrogen content of the woodchip bedding, hence aiding the composting process** and full details of this study can be found in [Report 6](#). Composts were checked for pathogens and found to be safe providing the composting guidelines had been followed as this created high temperatures which sanitized the compost. However, during composting the volume of material decreased and additional woodchip had to be sourced to supply sufficient material for the winter housing period but it must be remembered that the original quantities were only on a demonstration scale and in reality much larger quantities would be used.

Following all the work and activity carried out in the project an assessment was made of the cost effectiveness of using woodchip bedding. [Report 8](#) concludes that sourcing suitable wood, chipping on farm and re-using for several seasons is the most cost effective way of using woodchip bedding.

### ➤ **Conclusions and recommendations**

The Woodchip for Livestock Bedding Project has provided a valuable insight into the suitability of woodchip as a bedding material. The use of woodchip bedding continues to gain in popularity as farmers seek more sustainable materials and the information provided in this project will advise them on how to use woodchip effectively. In certain circumstances woodchip may not be suitable for some farms and the intention is that the information provided here will help farmers to assess their individual situation.

The main conclusions from the project are:

- **Woodchip as livestock bedding promotes high standards of health and cleanliness in sheep and cattle**
- **A moisture content of less than 30% is critical to maximize absorbency**
- **Regular turning of heaps during composting will encourage high temperatures and kill pathogens**
- **Woodchip compost is not suitable as a soil conditioner/fertilizer until it is fully broken down, this may take 2-3 years**
- **Composted woodchip can be re-used as bedding.**
- **Purchasing pre-chipped wood at 2006/07 prices is not cost effective. Buying wood at the right price, chipping on farm and re-using for several seasons makes woodchip financially viable.**

[Report 1: Woodchip for Livestock Bedding Project](#)

[Report 2: The Demonstration Farms](#)

[Report 3: Lamb Behaviour on Woodchip Bedding](#)

[Report 4: Assessment of Woodchip Compost](#)

[Report 5: Demonstration Farm Compost Analysis](#)

[Report 6: Woodchip Compost – options for use](#)

[Report 7: Pot Trials Report](#)

[Report 8: Economic Appraisal](#)

[Report 9: The impact of alternative bedding material on sheep behaviour](#)

**Project Partners**

IGER Aberystwyth  
Aberystwyth University  
Bangor University  
ADAS - Pwllpeiran  
Glynlifon College

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