

It ain't hay: Recycling agricultural film

by Natalie T. Starr



Proper storage is the key to successful agricultural film recycling.

Vermont's familiar landscape of rolling green pastures dotted with bright red dairy barns has a new addition — large, round hay bales covered with white plastic film.

While agricultural film (agfilm) provides a flexible, inexpensive method to improve hay and silage quality for dairy cows, farmers have often found themselves scrambling for disposal methods. According to the University of Vermont Extension Service (Burlington), more than 1.17 million pounds of agfilm waste are discarded annually in Vermont, with more than half of farmers in the state burning or burying some film on the farm.

A pilot project for collecting agfilm in Vermont found that proper handling can benefit recycling programs, as well as disposal programs.

Film collection

To determine if recycling is a feasible solution to the growing disposal problem, two Vermont solid waste districts and the UVM Extension, with technical assistance from the American Plastics Council (Washington), developed several pilot projects for collecting agfilm.

The projects collected three types of agfilms:

Hay sleeves/silage bags. Also known as "ag bags," this low density polyethylene

(LDPE) film is used to store and cover silage in long, narrow rows. Two layers of plastic, typically white and green, are bonded together to form a sleeve.

Bunker silo covers. This black LDPE film is used to cover the tops and sides of silage and hay in long, wide bunkers. The material is sometimes reused on the farm.

Silage wrap. White and tacky, this linear LDPE film is used to wrap round hay bales and keep them air- and moisture-tight.

Last summer, the Addison County Solid Waste Management District (Middlebury) conducted two agfilm collections — a drop-

off and an on-site farm collection service. The drop-off site was established at a large Middlebury College parking lot equipped with an indoor baler to bale the three different types

Table 1 Quantities and types of material accepted and rejected (in pounds)

	<u>Accepted</u>	<u>Rejected</u>	<u>Percent rejected</u>	<u>Total</u>
ACSWMD drop-off				
Bunker silo covers	835	545	39%	1,380
Silage wrap	25	235	90%	260
Silage bags	410	180	31%	590
ACSWMD on-site farm				
Bunker silo covers	1,050	2,850	73%	3,900
LSWMD drop-off				
All materials (1)	2,340	2,260	49%	4,600

ACSWMD = Addison County Solid Waste Management District.
 LSWMD = Lamoille Solid Waste Management District.
 (1) Rejection data by material were not collected. The majority of the material collected was silage wraps.
 Source: University of Vermont Extension Service, 1997.

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of film collected at the site. ACSWMD also provided on-farm collection to dairy farms along a fixed route, using an 18-cubic-yard compacting refuse truck to collect bunker silo covers directly from farmers.

The Lamoille Regional Solid Waste Management District (Morrisville) offered drop-off collection service at the Casella Recycling facility in Hardwick, where a baler and an inside storage area were available.

Material inspection

As part of the project, collection workers unrolled and inspected each piece of film brought in by farmers before accepting it for recycling. During on-site farm collection, film was inspected before it was loaded into the packer truck.

Material was accepted only if it was relatively free of moisture, dirt and silage. Moisture and dirt were the typical contaminants in both districts. Outdoor storage and wet weather before collection contributed to a high rejection rate. Figure 1 and Table 1 show the amount of material brought in for collection, as well as the amount accepted for recycling.

At the LSWMD collection program, almost an entire load of silage wrap had to be discarded due to moisture, dirt and baling twine contamination. About 50 percent of another load at the LSWMD collection had to be rejected due to moisture and dirt contamination.

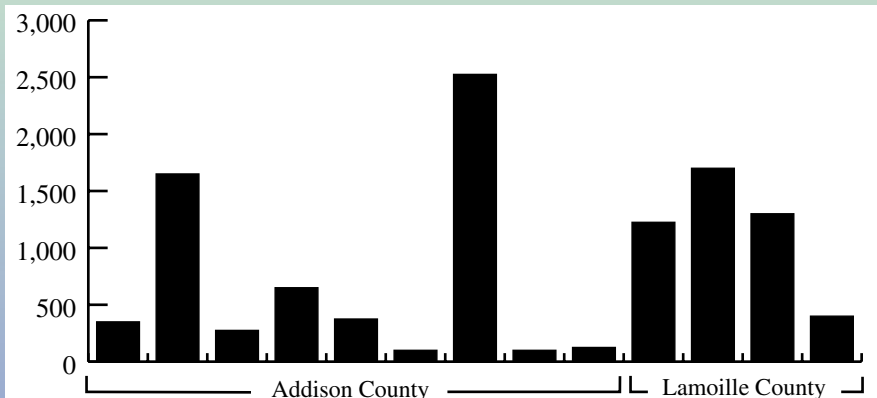
At the ACSWMD on-site farm collection program, the rejection rate was unusually high, because one participating farm had an enormous quantity of wet and muddy material that had been stored outside. Indoor storage of the material led to increased recyclability. In general, the material that was stored under cover, on an impervious surface and rolled up, was the easiest to handle and was relatively free of contamination. For example, nearly 100 percent of one load that had been stored indoors was accepted for recycling.

Consolidating

All material collected was baled before being transported to markets. The ACSWMD collection used a small horizontal baler, which required material to be hand-fed into the hopper. Although the baler was stored inside, there was not enough space for vehicles to enter the building and unload the material, which led to extra handling of the agfilm.

In comparison, the LSWMD collection site had a conveyor belt to feed the horizontal baler, as well as enough room for vehicles to enter the building to unload the material. This feed conveyor reduced the time and labor required to bale the material. However, large pieces of plastic film were harder to feed into the baler using the conveyor and occa-

Figure 1 Quantity of agricultural film dropped off by farmers (in pounds) ⁽¹⁾



(1) Each bar represents an individual farmer's delivered quantity.
Source: University of Vermont Extension Service, 1997.

sionally needed to be cut before feeding.

Marketing

Three markets were chosen to test bales, based on the following factors:

- proximity to Vermont
- production of an end-product in the Northeast or the U.S.
- willingness to accept test bales
- willingness to provide detailed information on test bales.

Results from the test markets indicated that limited markets currently exist for agfilm and that the current market price for agfilm is not enough to cover collection, baling and transportation costs.

Two of the three markets were ultimately willing to accept the material for recycling, and the best paying market had washing and drying capabilities. However, mixing lower quality agfilm with other film made it possible to sell the agfilm to a market without washing and drying capabilities.

At the time of the pilot project, the market price offered for agfilm was one to two cents per pound. Although one market anticipated the price would rise to six cents per pound, the program still would not pay for itself, due to the high cost of labor for handling and baling the material. However, some communities may still choose to support agfilm recycling as an environmentally sound alternative to on-farm disposal.

Educating farmers

Because there are clear advantages to keeping the film clean and dry for recycling or disposal, farmers need to be educated about the benefits of proper storage and disposal.

Overall, some farmers said they did not have adequate lead time to properly manage the film for recycling. Farmers also indicated that they should be notified in the fall for spring collections, so they do not dispose of the film over the winter, and so they can prop-

erly store it to reduce contamination.

However, many farmers said they were unwilling to commit the necessary labor and storage space to keep the material clean and dry for recycling. The high rejection rate of material indicates that farmers must make a greater effort to keep the material clean and dry if it is going to be recycled.

Farmers who recycled bunker silo covers through the on-site collection service made several recommendations they were willing to follow in the future:

- rolling back the material neatly, then cutting it off immediately, spreading it out to dry and putting it away in dry storage
- drying it out another day, then rolling it up neatly and putting it in dry storage.

Proper handling

Because one function of agfilm is to protect feed from moisture and dirt, it is naturally dirty. As a result, contamination issues will continue to be the biggest challenge to recycling the material.

Handling wet, dirty film is difficult and time consuming, regardless of whether it is for recycling or disposal. Some communities may want to support agfilm recycling to ensure that farmers properly manage their film. Clean, dry material is much lighter and easier to handle, thus bringing lower disposal costs and greater opportunities for recycling. **RR**

This article is one of a series of case studies of plastics recyclers, sponsored by the American Plastics Council (Washington). Previous articles are available on APC's Web site (<http://www.plasticsresource.com>).

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