Discarded Agricultural Plastics: Evolving Infrastructure & Markets for Recycling

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What Are Agricultural Plastics?

Bale Wrap: Stretch film wrapped around individual bales of hay or a line of bales

Photos: Lois Levitan, RAPPP

*Howland Farm, Candor NY, Spring 2006*
Greenhouse, hoophouse, high tunnel covers: clear or white sheets of LDPE or LLDPE.
Bunker silo covers:
Sheets of heavy duty black/white LDPE or nylon-reinforced LDPE
Mulch film: thin strips of LDPE typically 3’-5’ wide; white, black, silver, occasionally clear or other colors, sometimes 2 color layers.
Plant pots, flats, seedling trays
HDPE, PS, PP
Empty Containers & Drums — Pesticides, Oils, Other Chemicals: HDPE
Bird Netting

Rain Barrier

Photos: Lois Levitan  RAPP  Australian vineyards  2001
Net wrap, polytwine, coveralls, boat wrap, etc., etc., etc.
Why Recycle?
Open Burning Pollutes & Is Against the Law

- Emissions contain dioxins, heavy metals & particulates that settle in lungs
- Emissions from fires on farms settle near the source of food & feed
- NYS DEC enacted broader regulations on open burning Oct 2009

Photo by Patrick Atagi, taken on a farm in Oregon where burn barrels like these are legal.
Sheep farmer saved > 60,000 lbs of bale wrap from 1990 to his retirement in 2007 because “I didn’t want to burn it.”
### Energy Value of Plastics vs. Other Fuels & Wastes

<table>
<thead>
<tr>
<th>Material</th>
<th>Btu/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel oil</td>
<td>~20K</td>
</tr>
<tr>
<td>Agricultural Plastics</td>
<td>~20K</td>
</tr>
<tr>
<td>Rubber</td>
<td>11K</td>
</tr>
<tr>
<td>Coal (varies w/ type)</td>
<td>5K-12K</td>
</tr>
<tr>
<td>Wood, dry vegetation</td>
<td>~7K</td>
</tr>
<tr>
<td>Municipal solid waste</td>
<td>~5K</td>
</tr>
</tbody>
</table>

*BTU = British Thermal Unit = heat (energy) needed to raise one pound of water at maximum density one degree Fahrenheit, about equal to 1.06 kilojoules.*

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**Sustainable Materials Management**

**Energy & Resource Conservation**
Recycling Agricultural Plastics Project
Developing infrastructure and markets for waste film and rigid plastics from all sectors of agriculture.

RAPP: the little engine that hasn’t quite, but keeps trying.

Photo: Lois Levitan, RAPP
What Is RAPP

Cornell University-based collaboration with
• agricultural producers &
• organizations
• agencies
• businesses

Supporting
• agriculture
• environmental protection
• sustainable economics
• recycling

Locally, statewide, nationally, internationally

R E C Y C L I N G
D A I R Y  P L A S T I C S
Silage Bags, Bunker Covers, Bale Wrap, Containers, etc.

Best Management Practices to Keep Plastic Clean Enough to Recycle

- AVOID MUD and MANURE as much as possible. Don’t run tractor over plastic. Locate silage bags and bales on a concrete pad, asphalt, or on high, dry ground.
- CUT FILM BEFORE REMOVING SILAGE. Cut into pieces of size and weight one person can handle.
- SHAKE or BRUSH OFF forage, soil, stones.
- ROLL or FOLD DRY FILM into bundles about the size of a large pillow (2’ x 3’). Stored film must be dry!
- SEPARATE DIFFERENT PRODUCTS and TYPES. Do not mix different products in one bale (e.g., separate bale wrap from silage bags and bunker covers; twine or bale net from bale wrap, etc.). Separate cleaner film from dirtier. No PVC accepted.
- CHEMICAL CONTAINERS: Triple rinse to clean. See Ag Container Recycling Council (ACRC) website: www.acrecycle.org.
- STORE UNDER COVER: Keep clean and dry as possible — e.g., store on pallets in a barn, trailer, hay wagon or outside under a tarp.
- BALING: Make 1000 – 1200 lb bale. Label with permanent marker: type of material, date, contact/phone/location.
What RAPP Does

Figure 1: Life Cycle of Dairy Films

Agricultural Plastic Film Recycling: Feasibility and Options in the Central Leatherstocking-Upper Catskill Region of NYS

Levitan, Cox and Clarvoe. January 2005
Build & Strengthen Networks of Stakeholders
Equipment: Acquire, Distribute, Operate & Train Others to Operate

BigFoot Baler BF300
Advocate Re-Use When Feasible
What Else RAPP Does

- BMP GUIDELINES to prepare plastic for recycling
- CULTIVATE POTENTIAL MARKETS
- IMPLEMENT agricultural plastics recycling programs in NYS
- LOGISTICS for collecting, baling, storing plastic
- MARKETING
- OUTREACH to agricultural community
- PROMOTE “BUY RECYCLED”
- QUALITY CONTROL
- REWARD farmers who recycle
- SEEK means for long future
- TECHNICAL ADVISING
How NYS RAPP Is Organized
What Do Agricultural Plastics Become After Recycling?
New products appropriate for waste agricultural plastic feedstock

such as: parking bumpers, roofing & drainage tiles, plastic lumber, crude oil & plastic monomers

Criteria: minimal handling due to possible chemical residues
Reclaimed by processes that are:
→ “forgiving” of plant debris, moisture, possible chemical residue, mixed plastic feedstock
→ require low E and resource inputs; short transportation footprint
Manufacturers of nursery supplies testing waters of “take back” programs
EkoRoof Tile

Appropriate end use: minimal contact with people or animals

- Sealed against leaching, runoff of residues
- Meets ASTM, ASABE &/or other quality standards
- Competitive price point
- Strong consumer demand (current or potential)
Recycled baler twine that comes around. Goes around. Stays around (the bale).

The introduction of Revolver® is a direct response to our customers’ appeals for us to help clean up the environment. You can save time and the environment with Revolver® — made from recycled polypropylene, most of which is post-consumer baler twine. You make your living off of the land. We want to make sure we’re doing our part to protect it.

Revolver® is manufactured under the same stringent standards you’ve come to expect from Bridon Cordage and is currently available in the following products:

- 7200’ 190 Single Spool
- 9000’ 130 Single Spool
- 20,000’ 110 Single Spool
Issues:

• What is it?
• Color
• Stones
• Plant debris
• Chemical residue & chain of custody
• Amassing full loads
• Transportation
• Short-term high costs of waste minimization
• Market demand
• Who pays?
RAPP funding has come from New York Farm Viability Institute (NYFVI), NYS Department of Environmental Conservation, USDA Rural Development/NEWMOA, USDA Smith-Lever/Hatch, US EPA Region 2 Pollution Prevention, Empire State Development.

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