

Shorter-season corn hybrids often have small yield penalties compared to full season varieties, but they allow for timely plantings of cover crops.

## Plant cover crops in early-mid September for better benefits to growers & the environment:

1. Maximize nutrient recovery and recycling from fall-applied manure
2. Produce emergency/additional feed for early spring
3. Improve grower income by minimizing fertilizer purchase and total forage production
- 4 Comply with NMP regulations

### Background

Non pasture-based dairy farms are reliant on corn silage as their primary source of feed, which means large, quality yields are imperative. Depending on the ration mixture, an average lactating dairy cow will consume between 40 to 60 lbs. of corn silage daily<sup>1</sup>. Longer growing seasons have historically offered more dry matter (DM) production than shorter growing seasons because plants have more time to convert light energy into chemical energy, i.e. food. However, shorter-season corn hybrids have been in development for decades, and they are capable of competing with longer-season varieties by producing comparable amounts of DM in less time. The University of Massachusetts Amherst has 13 years of corn hybrid trial data confirming this yield potential (**table 1**). Longer-season varieties produce, in total weighted

**Table 1:** Average silage yields by year (adjusted to 70% moisture); overall average is weighted. Yields were recorded at the University of Massachusetts, Amherst Agricultural Research Farm in South Deerfield, MA, from 2002-2014.

Average Silage Yields (Tons A <sup>-1</sup> )				
Year	Shorter Season (≤ 98 days)		Longer Season (>98 days)	
	Yield	Varieties Tested (#)	Yield	Varieties Tested (#)
2002	26.0	10	26.6	19
2003	30.4	18	29.4	7
2004	21.8	11	22.8	14
2005	29.1	6	27.9	12
2006	30.0	7	32.0	13
2007	29.6	14	30.2	7
2008	35.0	7	36.4	10
2009	22.3	6	26.0	19
2010	27.6	8	29.3	12
2011	23.3	6	26.6	15
2012	32.3	10	36.4	17
2013	26.7	8	33.5	12
2014	25.4	9	27.3	16
<b>Weighted Yield Averages</b>	<b>27.9</b>		<b>29.2</b>	
<b>Sample Size</b>	<b>120</b>		<b>173</b>	

average, 4.7% more yield than shorter-season hybrids. Shorter-season hybrids are ready for harvest in 93-98 days, whereas longer season varieties require 99-114+ days to reach maturity – a possible difference of three weeks or more.

### Double Cropping System

Earlier silage harvests afforded by shorter-season hybrids allow for early, and thus, efficient plantings of cover crops in fall. Overwintering cover crops planted in the first week of September can capture up to 110 lbs. N A<sup>-1</sup>, depending on the cover crop species, history of manure application, soil organic matter levels, and the rate and method of fall manure application<sup>2</sup>.

In recent years, we have observed greater differences between shorter and longer-season hybrids; these yield differences are under observation as we continue evaluating corn hybrids supplied by seed companies

However, we are researching dual-purpose cover cropping strategies. Well-managed cover crops planted in early September, after the harvest of shorter-season corn, can be harvested for forage in the fall and spring. The harvested cover crop provides additional yield that can offset potential yield penalties associated with growing shorter-season corn hybrids. Furthermore, the cover crop will capture both N and P from fall-applied manure, facilitating on-farm nutrient cycling.

A multi-year, multi-location study conducted in the Pioneer Valley has shown that growers can harvest over 2 tons of cover crop dry matter, equivalent to 6-7 tons A<sup>-1</sup> of corn silage at 70% moisture<sup>2, 3</sup>. Similar yields were observed on 30 farms in New York. Fall planted cover crops in NY averaged 1.61 tons/A DM for rye, and 2.18 tons/A DM for triticale at May harvests in 2013 and 2014<sup>4</sup>. Additional research conducted in September 2014-August 2015 suggests harvesting a cover crop not only compensates for a small yield penalty in the shorter-season corn, but this double cropping system also results in greater yield than a single cropping system with a longer-season corn variety and no harvested cover crop<sup>5</sup>. The delayed harvest dates in late September and October required for longer-season corn varieties prevent effective cover cropping and satisfactory nutrient uptake from fall-applied manure.

### **Massachusetts NMP Regulation Compliance**

Shorter-season corn hybrids paired with early-planted cover crops also offer a window for compliance with the new Nutrient Management Plans (NMPs) in Massachusetts pertaining to fall manure application. The regulations state that manure may not be applied after September 15

unless under certain conditions<sup>6</sup>. By applying manure prior to cover crop planting, and planting the cover crop between the first and fifteenth of September, the application falls into compliance with the State regulation.

### **Additional Resources**

UMass, Amherst Corn Hybrid Reports:  
<https://ag.umass.edu/crops-dairy-livestock-equine/research/corn-hybrid-evaluation-reports>

MDAR Plant Nutrient Application Requirements for Agricultural Land and Land Not Used for Agricultural Purposes:  
<http://www.mass.gov/courts/docs/lawlib/300-399cmr/330cmr31.pdf>

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Corn hybrid data presented in this fact sheet was collected and analyzed by Dr. Masoud Hashemi, Dr. Steven Herbert, and Dr. Sarah Weis.

## References

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- <sup>2</sup>Hashemi, M., Farsad, A., Sadeghpour, A., Weis, S. A., & Herbert, S. J. (2013). Cover-crop seeding-date influence on fall nitrogen recovery. *Journal of Plant Nutrition and Soil Science*, 176(1), 69-75.
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## Acknowledgement:

This publication is part of a project that was fully funded through Northeast SARE Research and Education grant number LNE 15-340.

