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IMPORTANT IRM INFORMATION: RIB Complete® corn blend products do not require the planting of a structured refuge except in the Cotton-Growing Area where corn earworm is a significant pest. SmartStax® RIB Complete® corn blend is not allowed to be sold for planting in the Cotton-Growing Area. See the IRM/Grower Guide for additional information.

Performance may vary from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields.

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. Roundup Ready technology contains genes that confer tolerance to glyphosate, an active ingredient in Roundup® brand agricultural herbicides. Agricultural herbicides containing glyphosate will kill crops that are not tolerant to glyphosate. The distribution, sale, or use of an unregistered pesticide is a violation of federal and/or state law and is strictly prohibited. Not all products are approved in all states. Please visit <http://acceleronsas.com/stateapprovals> regarding the approval status of products containing **NemaStrike™ Technology** for application to seeds in your state. Acceleron®, Genuity®, NemaStrike™, RIB Complete®, Roundup Ready®, Roundup®, SmartStax® and VT Triple PRO® are trademarks of Monsanto Technology LLC. Channel® and the Arrow Design® and Seedsmanship At Work® are registered trademarks of Channel Bio, LLC. All other trademarks are the property of their respective owners. ©2018 Monsanto Company. All Rights Reserved



Before opening a bag of seed, be sure to read, understand and accept the stewardship requirements, including applicable refuge requirements for insect resistance management, for the biotechnology traits expressed in the seed as set forth in the Monsanto Technology/Stewardship Agreement that you sign. By opening and using a bag of seed, you are reaffirming your obligation to comply with the most recent stewardship requirements.



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Goodling, R., T. Beck and V. Ishler. Know your numbers. Funding provided by USDA-RMA.



Channel
Seedsmanship At Work®



Channel
Seedsmanship At Work®

Seedsmanship At Work® is the difference between buying products from a seed salesman and working with a local Channel Seedsman. A Channel Seedsman strives to be a trusted adviser on your farm, dedicated to delivering a customized hands-on experience for better yield potential with products placed to perform.

THAT'S SEEDSMANSHIP AT WORK.®

www.Channel.com

NORTHEAST
2019 FORAGE GUIDE

FORAGE SYSTEM



THE CHANNEL DIFFERENCE



Being a Channel customer means having a dedicated Channel Seedsman who knows your fields and provides customized product recommendations based on your specific conditions. It's like having your own personal seed expert dedicated to helping you achieve profitable results. For a Channel Seedsman, success is measured by understanding your unique challenges, providing unmatched service and placing products to perform for you. That's how Seedsmanship At Work® goes to work for you.

CHANNEL® FIELD CHECK UP SERIES

Through the Channel Field Check Up Series, Seedsmen add value at every stage of the growing season. Your Seedsman will be there from planting to harvest and beyond, monitoring crop development, offering advice to optimize yield potential and helping you plan for the next year.

SEEDLING

Your Seedsman helps ensure a strong start by evaluating planter performance, and assessing uniformity of emergence and development.



VEGETATIVE

At this stage, your Seedsman will partner with you to evaluate nutrient needs, as well as insect, weed and disease pressure.



REPRODUCTIVE

Your Seedsman will monitor overall plant health, checking pollination, performing root digs, and evaluating fungicide needs.



MATURITY

As harvest approaches, your Seedsman will perform final yield estimates based on kernel and stand counts and help create a harvest schedule.



Channel offers producers elite seed products chosen specifically for the quality characteristics and the tonnage you demand.

Your Channel Seedsman will give you a custom recommendation based on your specific needs. You'll also get expert agronomic advice to help get the most from every acre.

PRODUCTS PLACED TO PERFORM

Channel® products deliver thanks to Channel Seedsmen, who are dedicated to walking their customers' fields and providing customized recommendations based on the specific growing conditions they observe. It's an unmatched level of service that ensures products are placed to deliver optimum results for your herd.

ELEVATE YOUR POTENTIAL WITH A SINGLE DECISION



No two seasons are alike. Whether it's insects, diseases, nematodes, the weather or something entirely unforeseen, every year brings a new combination of threats to your crop's performance. As farming becomes more complex, the Acceleron® brand is focused on making planning and management easier. For 2019, the Acceleron portfolio offers a simple solution that delivers more complete protection from diseases, insects and nematodes, and helps plants reach more of the nutrients they need. This four-part seed treatment includes fungicides, insecticide, nematicide and biologicals. By helping you manage the impact of yield-limiting factors and support vital plant processes from the start — with one simple solution — Acceleron helps you increase the stability of your outcomes from year to year.

Acceleron® B-300 SAT + Product to be branded as Acceleron® B-360 ST pending regulatory approval

Dual action biological offering that will contain *Penicillium bilaiae* and an LCO (Lipo-chitooligosaccharide)

*Available seamlessly on all 2019, 2018, and 2017 corn products.

How it works:

- Acceleron B-300 SAT (*Penicillium bilaiae*) releases phosphate bound in the soil, making it available to the plant
- Acceleron B-360 ST (LCO SP104), pending regulatory approval, is designed to enhance mycorrhizal colonization, which:
 1. Demonstrated increased functional root volume by 85%**
 2. Increases water and nutrient uptake through the roots
- Increased nutrient availability and nutrient/water uptake increases yield potential

**Based on roots, lead issue and fresh weight from 78 trials over 2 years

PRODUCTS FEATURING NEMASTRIKE™ TECHNOLOGY

NemaStrike™ Technology is a seed treatment technology that provides broad-spectrum nematode control for corn and soybeans. With a novel mode of action, it is designed to stay in the root zone for up to 75 days and has provided broad spectrum control and an average yield protection advantage of 6 bushels per acre over Acceleron® Seed Applied Solutions base offering in corn.*

Individual results will vary based on nematode pressure in each field.

*4-Year Average Yield Protection Advantage over control, across all locations and thresholds, N = 140 Trials (2014, 2015, 2016, 2017) (AR, GA, IL, IN, IA, KS, KY, MD, MI, MN, MS, MO, NE, NC, ND, OH, SC, SD, TN, TX, VA, WI)

Results will vary based on nematode pressure in each field.

CHANNEL KNOWS FORAGE

FORAGE
SYSTEM

CORN SILAGE PRODUCTS

PLACED TO PERFORM

Corn product selection is one of the most important management decisions in silage production.

Working with your Channel Seedsman and your operation's nutritionist, you can navigate the challenges of corn silage product selection by considering the following factors that affect a quality corn silage crop.

PLAN A PACKAGE

Develop a silage production plan that will include a package of several corn products. The goal is to help spread the harvest window and reduce agronomic risk while maximizing yield and quality. Factors such as herd feed requirements (feed inventory) and harvest timing should be thoroughly considered.

AGRONOMICS

Identify a portfolio of corn with strong agronomic characteristics that are adapted to your farm. Consideration should be given to biotech traits for efficient insect and weed control in addition to drought tolerance and foliar health, such as tolerance to Northern Corn Leaf Blight. Corn response to higher populations may be another consideration, based on your operation.

STARCH

Starch is the single most important contributor to energy content, accounting for 60 to 65 percent of the energy in corn silage. The value of starch content and starch availability in corn products designated for silage production is quickly becoming an accepted management practice. Starch

percentage is easily determined and varies between products. ISVD-7hr detects differences between silages and monitors changes in starch digestibility due to the fermentation process and storage time.

YIELD POTENTIAL

Independent research has demonstrated that grain yield is generally an excellent indicator of whole plant silage yield. There often can be a 5 to 10 ton per acre yield difference between products. This difference can be accurately measured and attributed to genetic differences among corn products used for silage. Grain is highly digestible and can account for up to 50 to 75 percent of the energy in quality corn silage.

FIBER DIGESTIBILITY

Corn products chosen for silage should possess low overall fiber levels as measured by Neutral Detergent Fiber (NDF). In addition, these products should demonstrate above-average fiber digestibility as indicated by Neutral Detergent Fiber Digestibility (NDFD) and Undigestible Neutral Detergent Fiber (uNDF) measurements. Management practices and environmental influences typically have a greater effect on fiber digestibility than germplasm effect.

Example: Value per acre of a 1% difference in starch per ton of silage							
	10 tons/A	15 tons/A	20 tons/A	25 tons/A	30 tons/A	35 tons/A	40 tons/A
\$3/Bu	\$15.00	\$22.50	\$30.00	\$37.50	\$45.00	\$52.50	\$60.00
\$4/Bu	\$20.00	\$30.00	\$40.00	\$50.00	\$60.00	\$70.00	\$80.00
\$5/Bu	\$25.00	\$37.50	\$50.00	\$62.50	\$75.00	\$87.50	\$100.00

Example: At 20 tons/A and \$3/Bu, a 2 percent starch difference would equal a \$60.00 value per acre (2 x \$30 = \$60.00). And if one unit of seed plants 2.5 acres, this then equates to a \$150.00 value per unit of seed (\$60.00 x 2.5 = \$150.00).

To determine total value per unit of seed	
Multiply value per acre (see chart above) by the total percent starch difference, multiplied by the acres planted/unit. This gives you the total value per unit of seed.	
<i>Value Per Acre x Total Starch Difference x Acres Planted/Unit = Total Value per Unit of Seed</i>	

FORAGE SYSTEM

CHARACTERISTICS CHART

New	Channel® Brand Blends	QUALITY CHARACTERISTICS										AGRONOMICS				DISEASE	
		Relative Maturity	Yield at 70% H ₂ O ²	NDF ²	NDFD 24hr ²	NDFD 30hr ²	uNDF240 ²	Starch ²	IVSD 7hr (4mm) ²	Milk per Ton ²	Milk per Acre ²	Plant Height ³	Seedling Vigor ²	Drought Tolerance ²	Stay Green ²	Gray Leaf Spot ²	Northern Corn Leaf Blight-Race 1 ²
	189-03VT2PRIB	89	2	1	4	5	2	2	3	5	1	MT	2	2	4	-	4
	192-10STXRIB	92	3	5	4	3	2	4	3	4	4	MT	2	2	3	3	-
New	192-98STXRIB	92	3	4	3	3	1	3	4	3	2	MT	2	3	3	5	4
	194-14VT2PRIB	94	4	2	3	5	3	2	3	2	4	MT	2	3	2	-	4
	197-68STXRIB	97	2	4	4	4	3	4	4	3	2	MT	2	2	3	3	4
New	197-90STXRIB	97	-	-	-	-	-	-	-	-	-	MT	2	2	2	5	4
	198-98STXRIB	98	2	2	3	3	2	3	4	3	2	MT	2	4	2	5	3
	202-20STXRIB	102	3	2	4	4	4	4	3	3	3	MT	2	2	2	4	3
New	202-81STXRIB	102	-	-	-	-	-	-	-	-	-	M	3	2	3	5	4
	203-01STXRIB	103	4	2	1	6	2	3	2	1	3	M	2	3	2	5	4
	203-44STXRIB	103	3	3	4	4	4	2	4	3	3	M	3	3	4	5	3
	205-19STXRIB	105	3	3	4	4	3	4	3	3	3	M	3	3	3	4	3
	206-11STXRIB	106	2	4	3	3	2	4	2	2	2	M	1	3	3	4	3
	207-27STXRIB	107	3	2	1	3	1	3	3	1	3	M	3	3	2	4	3
New	207-90STXRIB	107	-	-	-	-	-	-	-	-	-	MT	2	2	3	4	4
	209-15STXRIB	109	3	6	2	4	2	6	3	3	2	MT	3	2	5	4	3
	210-95STXRIB	110	3	2	2	3	2	3	3	1	3	M	3	2	3	5	4
New	210-98STXRIB	110	2	2	2	3	2	3	3	1	2	MT	2	2	2	4	3
	212-20STXRIB	112	3	3	4	4	4	3	4	4	3	M	3	3	2	3	4
	215-83STXRIB	115	2	5	2	3	3	5	3	3	2	MT	1	2	2	5	4
	215-98STXRIB	115	2	5	3	3	4	4	3	3	2	MT	2	3	3	5	3
	218-44STXRIB	118	2	5	3	1	4	5	3	4	3	MT	3	2	1	4	3
New	219-77STXRIB	119	-	-	-	-	-	-	-	-	-	MT	3	3	3	4	3
	220-98STXRIB	120	4	6	6	1	5	2	1	5	2	T	3	2	1	5	3

KEY

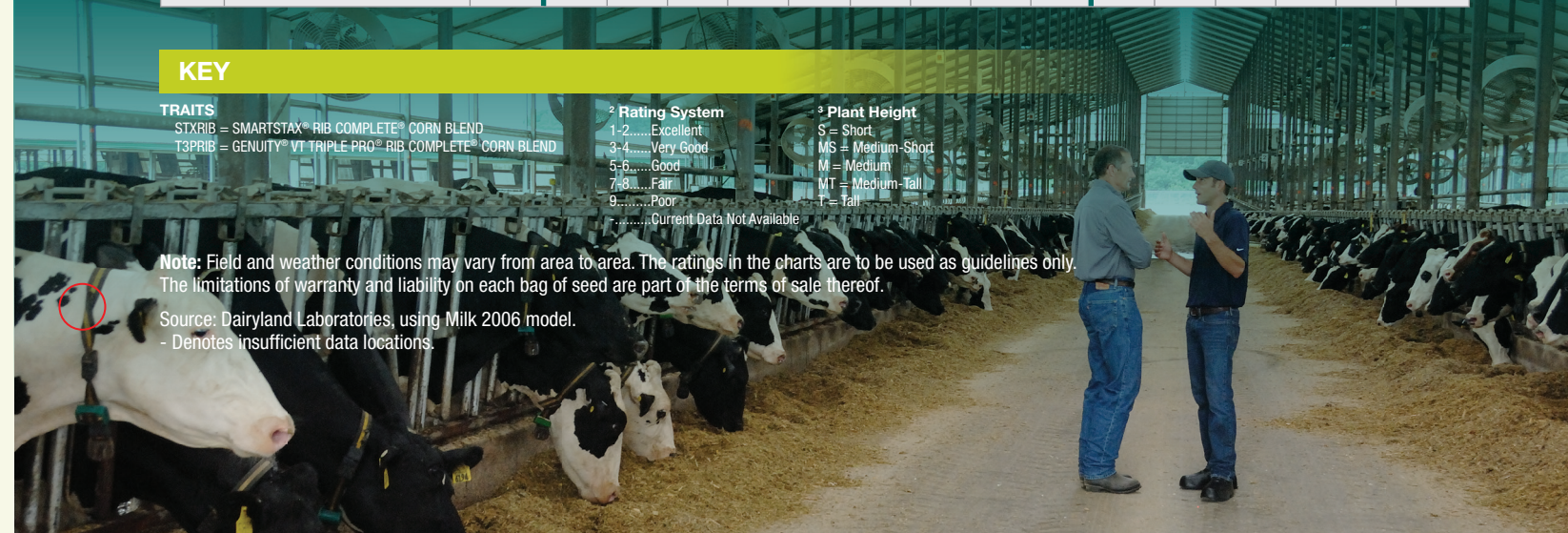
TRAITS
 STXRIB = SMARTSTAX® RIB COMPLETE® CORN BLEND
 T3PRIB = GENUITY® VT TRIPLE PRO® RIB COMPLETE® CORN BLEND

2 Rating System
 1-2.....Excellent
 3-4.....Very Good
 5-6.....Good
 7-8.....Fair
 9.....Poor
Current Data Not Available

3 Plant Height
 S = Short
 MS = Medium-Short
 M = Medium
 MT = Medium-Tall
 T = Tall

Note: Field and weather conditions may vary from area to area. The ratings in the charts are to be used as guidelines only. The limitations of warranty and liability on each bag of seed are part of the terms of sale thereof.

Source: Dairyland Laboratories, using Milk 2006 model.
 - Denotes insufficient data locations.



CORN SILAGE CONSIDERATIONS

HARVEST AND FEED MANAGEMENT

From the field to the feed bunk, best management practices can help you optimize every step of production.

Your Channel Seedsman is with you every step of the way. Helping you maximize the opportunity for forage quality and production efficiency with best practices for harvest and feed management.

PREPARING FOR HARVEST

A successful harvest begins with preparation. Prior to harvest, equipment should be serviced and storage structures should be checked for cracks, holes or eroded concrete. Be sure to make any necessary repairs to safeguard forage quality and the working environment.

MOISTURE CONTENT

Corn silage is ready for harvest when the whole plant moisture reaches 55 to 70 percent, depending on the storage structure:

SUGGESTED CORN SILAGE MOISTURE CONTENT LEVELS BASED ON SILO STRUCTURE	
Bunker/Pile	63 to 70%
Stave/Bags	63 to 68%
Oxygen Free	50 to 60%

Source: From Harvest to Feed: Understanding Silage Management 2004

CHOP LENGTH

For optimal fermentation, corn silage should be chopped at a length appropriate to your storage structure. The Penn State Particle Size Separator can be used to evaluate particle length:

- Empty a 3-pint sample into the separator
- Shake the separator 40 times with enough strength to move the sample across the screens
- Midway through, check the top screen for clumping and break-up if present
- Weigh the content remaining in each individual screen
- Divide the total weight by the tray weights to determine the distribution

RECOMMENDED CORN SILAGE PARTICLE SIZE DISTRIBUTION		
Screen	Particle size (inches)	Corn silage % (processed and unprocessed)
Upper Sieve	>0.75	3-8
Middle Sieve	0.31-0.75	45-65
Lower Sieve	0.07-0.31	30-40
Bottom Pan	<0.07	<5

Source: From Harvest to Feed: Understanding Silage Management 2004

PROCESSING

Processing can optimize forage quality and enhances storage ability. For conventional corn silage, roller clearance should be set at 1 to 3 millimeters, following manufacturer's recommendations. Ninety to 95 percent of kernels should be crushed or cracked and cob pieces no bigger than 1/8 of an inch.



STORAGE

Proper storage can optimize forage quality. Storage facilities should be filled quickly to achieve optimal silage density. Crop maturity, moisture content, particle length, silo type and filling method, distribution and compaction should all be considered. In vertical silos, bulk density should be close to 20 pounds per cubic foot (lb/ft³). Consult the chart below for horizontal silos:

DENSITY FOR CORN SILAGE STORED IN HORIZONTAL SILOS		
	Corn silage (81 silos) Average ± standard deviation	Range
Dry matter, %	34 ± 5	25 – 46
Bulk density, lbs/ft ³	43 ± 8	23 – 60
Dry density, lbs/ft ³	14.5 ± 2.9	7.8 – 23.6

Source: Muck and Holmes. 2000. Applied Engineering in Agriculture. 16:613-619.

OPTIMAL PACKING PRACTICES

Horizontal silos and piles should be filled in thin layers with continuous packing, extra weight, tire air pressure and a maximum slope ratio of 1:2 on top. Be aware of edges, sidewalls, reach of feed out equipment, and other potential safety hazards of packing. Seal rapidly and tightly. Exposure to air early in the fermentation process delays the drop in pH and prolongs the time needed to help achieve stable silage.

FERMENTATION PROFILE	
Corn silage	pH 3.5 to 4.5
Lactic acid	70% of total acid produced (3-8% on a DM basis)
Acetic	1 to 4% DM
Propionic	<0.50%
Butyric	0%

Additives can aid in fermentation. Microbial inoculants have been shown to aid fermentation under certain conditions. Consult your local expert for that recommendation.

MONITOR QUALITY WITH ROUTINE FORAGE TESTING

Routine testing to analyze the nutritional quality of your corn silage can help you better understand feed efficiency. Corn silage analyses from Dairy One Forage Testing Laboratory over the last 16 years are shown below.

CORN SILAGE ANALYSES: HOW DOES YOUR OPERATION COMPARE?						
Nutrient	No. of samples	Average	Range	Standard Deviation	Your Sample 1	Your Sample 2
Dry matter, %	273,697	33.69	24.42 – 42.97	9.27		
Crude protein, %	269,727	8.27	7.21 – 9.32	1.06		
NDF, %	272,529	43.63	37.70 – 49.57	5.93		
NDFD, 30 hr. (% NDF)	62,373	52.46	46.37 – 58.56	6.10		
Starch, %	231,752	31.8	24.34 – 39.28	7.47		
Starch Dig, 7 hr. (% starch)	34,803	70.38	45.12 – 95.63	25.26		

CORN SILAGE CONSIDERATIONS

NUTRITION AND FEED MANAGEMENT

Best management practices can help you get the total value from your total mixed ration.

Monitoring the quality of your silage can improve feed efficiency. Your Channel Seedsman can help you maximize your silage investment potential long after harvest.

FEED & HERD MANAGEMENT

Penn State researchers have established benchmarks for dry-matter intake efficiencies. These benchmarks can be met with good management and appropriate product selection. This includes providing good forage quality, maintaining adequate inventory to keep rations consistent, cow comfort, and high-quality grains and byproducts. Ultimately, the best information is within the dairy, knowing where the herd has been and where it is trying to get to. This requires good record keeping and monitoring.

HERD METRICS: HOW DOES YOUR HERD COMPARE?			
Metric	Recommended Benchmark Range	Your Sample 1	Your Sample 2
Avg. milk per milk cow (bulk tank)	>75 lbs (2x) >85 lbs (3x)		
Components	>5.5 pounds/cow/day (fat and protein per milk cow)		
Dry matter intake	48-52 lbs/cow/day		
Dry matter intake efficiency	>1.45 (energy corrected milk ÷ dry matter intake)		

PROCESSING

With proper processing, you can optimize the amount of starch available to the cow for performance and production. There are two tests available that can help determine how well the ration is working:

- Fecal starch
Ideal is <3% and acceptable is <5% on a dry matter basis
- Corn silage processing score
Ideal is >70% of starch passing a 4.75mm screen

TOTAL MIXED RATION (TMR) ANALYSIS

When production or components are not what is expected, analyzing the TMR and comparing it to the formulated ration can identify problems in mixing or feed out. In addition to the nutrient levels, particle size can also determine if sorting is a problem.

RECOMMENDED TMR PARTICLE SIZE DISTRIBUTION		
Screen	Particle size (inches)	TMR %
Upper Sieve	>0.75	2-8
Middle Sieve	0.31-0.75	30-50
Lower Sieve	0.07-0.31	30-50
Bottom Pan	<0.07	< 20



Controlling feed costs plays an important role in managing profitability for your operation.

Your financial performance depends on a number of variables. You can count on your Channel Seedsman to help you get the most from your corn silage investment.

COST-OF-PRODUCTION CONSIDERATIONS

From feed to labor, a variety of factors influence your cost of production. Factors to consider include:

Annual milk pounds shipped

- **Annual cow flow**
- **Matching revenues to cost**
Such as sizing hired labor and overhead for the amount of income generated
- **Balance of the dairy enterprise**
Including land base, maintaining herd size for facility, percent of home raised feeds

Breakeven cost of production

- Where are the majority of costs?
- Are you maximizing home-raised feeds—quantity and quality—while controlling costs?
- Are asset investments—including land and building equipment—within reason for production level?

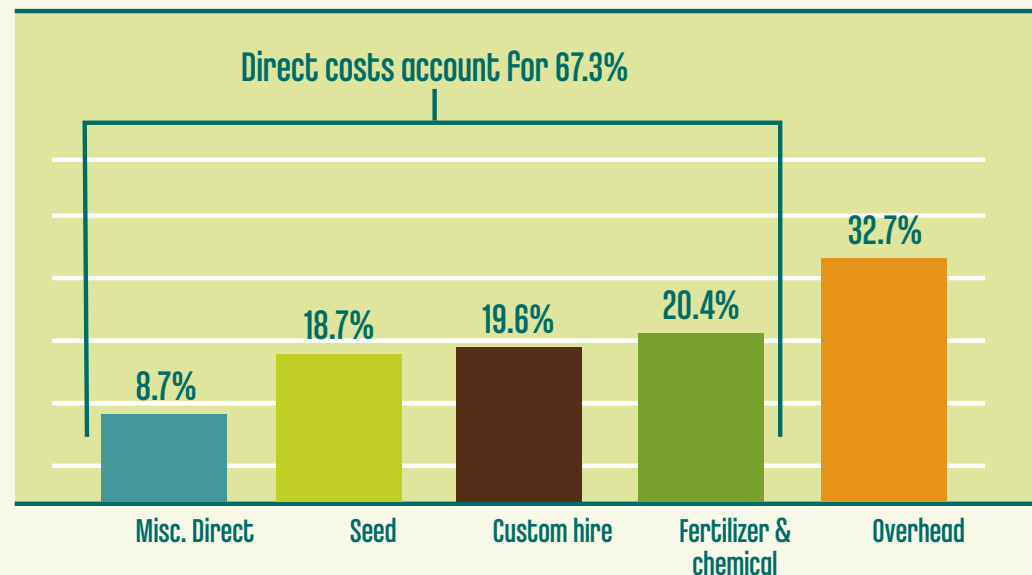
Relationship of feed cost to breakeven costs

- Increasing home-raised quantity & quality

Role of inventory management

- Higher tonnage to limit forage changes

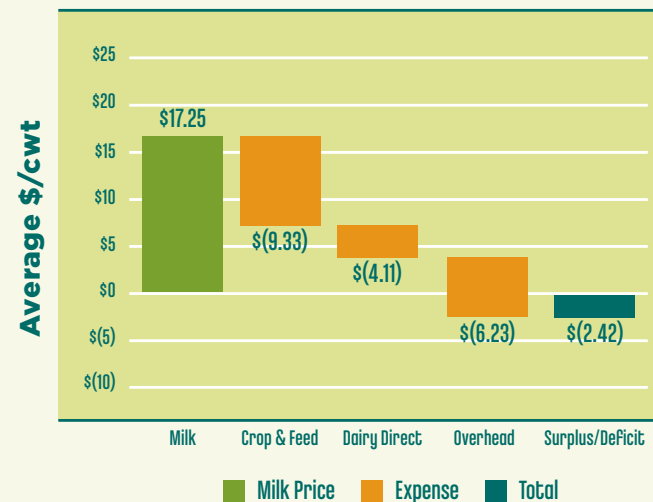
PERCENT OF AVERAGE 2016 CORN SILAGE COSTS: \$32.82/T



Source: Ishler 2017. V., R. Goodling and T. Beck. The impact of corn silage harvesting and feeding decisions on income over feed costs. Funding provided by Northeast Sustainable Agriculture Research and Education project ENE15-136.

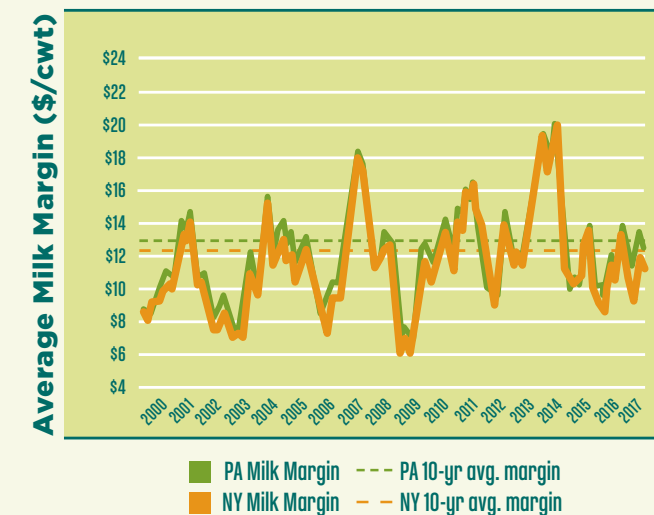


2016 DAIRY ENTERPRISE ANALYSIS (24 FARM AVERAGE)



Source: Ishler 2017. V., R. Goodling and T. Beck. The impact of corn silage harvesting and feeding decisions on income over feed costs. Funding provided by Northeast Sustainable Agriculture Research and Education project ENE15-136.

DAIRY MARKET OUTLOOK: HISTORY AND TRENDS OF MILK MARGIN 17-YEAR PA AND NY MILK MARGINS*



*NY feed cost based on NY Alfalfa hay, PA corn grain, and V. Ishler's Feed Price List. For the current dairy outlook, visit www.extension.psu.edu/dairy and search for "Dairy Outlook".
Source: Goodling, R., T. Beck and V. Ishler. Know your numbers. Funding provided by USDA-RMA. 2017.

CALCULATE YOUR MILK MARGIN AND INCOME OVER FEED COST (IOFC):

		PA 5-yr Avg	NY 5-yr Avg	Your Herd Sample 1	Your Herd Sample 2
A.	Gross Milk Price ¹ (\$/cwt)	\$20.31	\$20.00		
B.	Milk Production ^{1,2} (lbs/milk cow/day)	64.1	72.3		
C.	Milk Cow Feed Cost ^{1,3} (\$/cow/day)	\$5.24	\$5.32		
D.	Feed Cost ⁴ (\$/cwt) C ÷ B * 100	\$8.17	\$7.35		
E.	Milk Margin ⁴ (\$/cwt) A - D	\$12.14	\$12.65		
F.	IOFC ⁴ (\$/cow/day) (B * (A ÷ 100)) - C	\$7.78	\$9.15		

¹Five-year average of monthly prices and production, 2012-2017

²Estimated from NASS monthly milk cows (all) and milk production, assuming an average 87% in milk from DRMS Dairy Metrics (USDA, 2018; DRMS, 2018)

³Based on corn, alfalfa hay, and soybean meal equivalents to produce 75 lbs. of milk (Bailey & Ishler, 2007)

⁴Calculated from the five-year averages for milk price, milk production, and feed cost.