

Transition Calves – Maintaining Health and Growth

By Betsy Hicks, Area Dairy Specialist

In preparation for our upcoming Transition Calf Workshops this March, the other regional Dairy Specialists and I have been working on translating research, on-farm work and important tips and troubleshooting ideas into a meaningful, demonstrative workshop that calf managers will be able to pull out key concepts to bring home to



their own farms. We've broken the workshop down into four main areas: nutrition, inventory management, facilities design and health; each section will feature demonstrations and utilize participant interaction to add to overall impact of the day.

The transition calf is a heifer deserving of much attention, as it's a critical time between the milk phase diet of a calf and the solid feed diet of a heifer. Transition calves are ones that face many changes: social & grouping changes – like from an individual pen to group pen, location changes – like from a hutch with buckets to a larger bedded pack with slant bars, feed changes – removal of milk as a source of nutrition to just solid feeds, along with vaccinations, time of year challenges and more. The way in which we manage those changes around this time directly influences how well she transitions, including her health and growth.

Why do we call her a transition calf? Much of the former sentences talk about the things we're doing in management to transition her from a neonate fed milk to a growing heifer. I like to think we call her a transition calf

because of the changes going on inside her rumen. As a newborn, her rumen is small and undeveloped – both in size, musculature, microbial population and papillae. As a growing heifer, her rumen will have more than doubled in size, and features rumen muscles to mix fermenting feed, microbes to digest that feed, and papillae to absorb the produced volatile fatty acids as an energy source. The transition from newborn to heifer doesn't happen overnight, and the way

If you'd like to have your transition calf program looked over, reach out to Betsy. We have tools to examine ventilation, stocking density, and ideas to troubleshoot this time period.

in which we help that transition calf prepare her rumen is a large part of how successful her overall transition through weaning will be.

So how can we best prepare her? Considerations should include those things that help develop her rumen without sacrificing health or growth. Management around weaning should go over method of, approach to, and duration of weaning – the longer we can stretch this out, the more time her rumen has to adapt to eating more solid feed. Consumption of starter before

being weaned should reach a minimum of 4 pounds for 3 consecutive days. Starter should be verified to contain the appropriate amount of protein for amount consumed, so that when

(Continued on page 2)

The **South Central New York Dairy and Field Crops Program** is a Cornell Cooperative Extension partnership between Cornell University and the CCE Associations in six counties.



Cornell Cooperative Extension

South Central NY Dairy and Field Crops Program

We are pleased to provide you with this information as part of the Cooperative Extension Dairy and Field Crops Program serving Broome, Cayuga, Cortland, Chemung, Tioga and Tompkins Counties. **Anytime we may be of assistance to you, please do not hesitate to call.** Visit our website: <http://scnydfc.cce.cornell.edu> and find us on social media! Facebook, YouTube, & Twitter!

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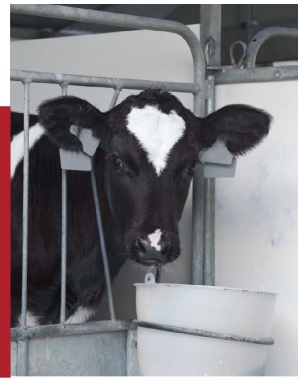
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Colostrum and calf-hood technology

March 18

6:00 pm

BW's Restaurant
11070 Perry Rd.
Pavilion, NY 14525

[CCE NWNV](#)

[Team Event Page](#)

March 19

12:00 pm

Dairy One
730 Warren Rd
Ithaca, NY 14850

[CCE SCNY](#)

[Team Event Page](#)

March 19

5:30 pm

CCE Madison
100 Eaton St.
Morrisville, NY 13408

[CCE CNY](#)

[Team Event Page](#)



What to Expect

Dr. Melissa Cantor, Penn State University, will present new research into extended colostrum feeding both as a preventative therapy and an intervention strategy for sick calves. She will also delve into new uses of calf-hood technologies such as activity monitors, auto-feeders and the role that AI can play.

Thank you to our sponsors!

DFA, Farm Credit East, Feed Works, Perry Vet, Zoetis

(“Transition Calves”, continued from cover)

calves are fully weaned, protein requirements are met with the starter alone. The importance of water cannot be understated. To eat the proper amount of starter, calves with likely need to consume at least 3 gallons of water per day, more if it's hot out.

Timing of changes should also be staggered - make one change at a time:

- Don't move them when you wean them
- Don't change the feed when you wean them
- Don't change the feed when you move them
- Don't vaccinate when you wean
- Don't dehorn when you wean
- Space out all the stressful events!

If our heifers are experiencing a health challenge after weaning and through transition, it's a good chance to go back and examine the basics. Have we introduced too many new things? Have we given enough room – does she have at least 40 square feet of resting space? Does she have access to water in a way she is familiar with? Have we asked her to learn too many new things – headlocks, ball waterers, new pen mates, new feed? Have we overloaded our barns' ventilation? Troubleshooting the basics through this time period often results in finding a few small changes that can yield a big positive for our transition calf.





Cornell Cooperative Extension

Transition Heifer Calf Program

10:00am to 3:00pm

- ◆ Offered in English and Spanish at each site
- ◆ Stations with hands-on activities/demos

Who Should Attend:

- ◆ Calf and heifer managers, dairy herdspeople, farm owners, and heifer raisers interested in learning more about how to better house and manage animals as they transition from the calf phase to the weaned heifer phase.

Topics Covered:

- ◆ Nutrition
- ◆ Housing and Management
- ◆ Health
- ◆ Inventory Management

Registration: \$25 per person (includes lunch)

Biosecurity: All attendees must wear clean clothes and boots, and will be required to scrub and disinfect footwear upon arrival to the program and before leaving.

For information: Kathryn Barrett, PRO-DAIRY;
kfb3@cornell.edu;
607-229-4357

Thank you to the event sponsors:

**DFA
Farm Credit East
Feed Works
Perry Veterinary Clinic
Zoetis**

2025 Dates and Locations:

Northwest New York

March 18 | Breezyhill Farm
2690 N Sheldon Rd, Strykersville, NY

March 19 | Lightland Farm
3053 Depew Rd, Stanley NY

Register: <https://wnnyteam.cce.cornell.edu/events.php>

South Central New York

March 20 | AM—Elm Tree Inn, 2 McLean Rd, McLean, NY 13102,
PM—Millbrook Farm, Freeville, NY

March 27 | Patterson Farms, Inc; 1112 Townline Rd, Auburn, NY 13021

Register: <https://scnydfc.cce.cornell.edu/events.php>

Central New York

March 26 | Location TBD

Register: <https://cnydfc.cce.cornell.edu/event.php?id=2557>

Southwest New York

March 24 | Telaak Farms
7301 Hinman Hollow Road,
Mansfield, NY

Register: <https://swnydlfc.cce.cornell.edu/event.php?id=2570>



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Revisiting Corn Rootworm Management: Why are All Rootworm Trait Packages Failing?

by Persistent BioControl Blogs

Why are all the Rootworm Trait packages failing at the same time?

All the Bt-rootworm trait packages are failing across the corn growing region independent of the seed company because all the seed companies are using the same Bt – RW toxins regardless of seed brand.

There are only three Bt-RW toxins in the market and functionally, two of those toxins are so similar that rootworm cross resistance to all three related toxins was reported in 2014.

What are those three Bt-RW toxins?

The initial RW trait packages in corn contained a single toxin when introduced.

- Monsanto/Bayer single toxin (Cry3Bb1) was first marketed in 2003 as YieldGard-RW or YieldGard TriplePro. **Rootworm resistance** was documented in **2009**.
- Dow/Corteva single toxin (Cry34Ab1/Cry35Ab1) was first marketed in 2006 as Herculex-RW or AcreMax. **Rootworm resistance** was documented in **2013**.

Syngenta single toxin (*mCry3A*) was first marketed in 2007 as Agrisure. **Rootworm resistance** documented in **2011**.

What are Pyramid trait packages?

When corn seed companies begin seeing rootworm trait failure in the field, they introduced two toxin rootworm trait packages to combat the emerging rootworm resistance to the single toxin trait packages. These two toxin trait packages were simply two different single RW toxins combined into a single trait package.

- Monsanto/Bayer introduced **SmartStax** in 2010 which is the combination of their RW toxin (Cry 3Bb1) + the Dow/Corteva RW toxin (Cry34Ab1/Cry35Ab1). **Rootworm resistance** documented in **2017**.
 - Syngenta introduced **Duracade** which was introduced in 2014. Duracade is a combination of two closely related Syngenta toxins (*mCry3A* + *eCry3.1Ab*) and **Rootworm resistance** was documented in **2016**.
- Corteva/Pioneer introduced **Qrome** in 2014. Qrome is a combination of the Syngenta toxin (*mCry3A*) and their own Herculex-RW toxin (Cry34Ab1/Cry35Ab1). Resistance to this pyramid has not been documented in the scientific literature. but resistance to the individual toxins were



reported in 2011 and 2013. Poor field performance of this pyramid is frequently reported.

What are the newly advertised three RW trait packages?

Bayer has recently introduced a 3-RW toxin trait package (SmartStax Pro) for corn farmers and a similar 3-RW trait package (Vorceed) is scheduled to be introduced by Corteva/Pioneer in the near future. Both trait packages by the two different companies contain near identical RW toxins and are functionally identical.

In both cases, a new RNAi toxin (dVsf7) has been added to either SmartStax or Qrome. Research has shown that **corn rootworm has developed resistance in the laboratory** to the new **RNAi toxin in just two generations** (equivalent to 2 years) and reported in 2018.

Only 3 Bt Toxins, 2 very similar.

Resistance reported to all 3 toxins in 2014.

- 2003-Yield Guard-RW marketed. Resistance in 2009
- 2006-Cry34Ab1/Cry35Ab1 (Herculex). Resistance in 2013
- 2007-mCry3A (Agrisure). Resistance in 2011

Management of Corn Rootworm in NY

1st Year Corn: No action necessary

2nd Year Corn:

- 1) Gamble (25-35% risk of CRW feeding damage)
- 2) High Rate of Seed Treatment (1250)
- 3) 50% rate of soil insecticide

3rd –4th⁺ year Corn:

- 1) Soil Insecticide (full rate)
- 2) Bt-Rootworm Corn **OR**
- 3) Application of Bio-persistent nematodes (1 time application) + Bt-Rootworm corn

Biocontrol Nematodes and Rootworm

by Persistent BioControl Blogs



How long does it take for Biocontrol Nematodes to impact rootworm in the field?

Biocontrol Nematodes do not achieve full activity until the second growing season after application. The level of activity in year 1 is influenced by the method of application (pivot vs sprayer), length of time between application and rootworm hatch, and the level of soil moisture during the rootworm larval period (June-early July).

With a May application, the year 1 activity level will range between 60% and 80% of full activity. This activity level will rise to 100% for the second growing season.

Since rootworm typically hatch around June 1st, a Biocontrol Nematode application in early May will typically have a bigger year 1 impact on rootworm than a late May application.

This is because of the Biocontrol Nematodes have more time to move throughout the soil profile before rootworm egg hatch.

What yield recovery should I expect using Biocontrol Nematodes with my failing RW trait?

Farmer field trials indicate yield recovery from increased rootworm control with Biocontrol Nematodes ranges from 6 bu/ac to 15+ bu/ac in the year of application (first year).

The level of yield recovery is dependent on the timing of the application, soil moisture conditions, method of application and the level of rootworm pressure in the field.

Second year yield recovery is dependent on the level of year 1 yield recovery and the level of reduction of rootworm feeding the first year.

How much reduction in root feeding should I expect?

With an early-mid May Biocontrol Nematode application, farmers should see a major reduction in root feeding damage throughout the field.

- There will remain some rootworm hotspots where the rootworm females dumped a lot of eggs the previous fall and the Biocontrol Nematodes have not “caught up” to the high level of rootworm larvae.
- In year 2, a majority of these “hotspots” will have disappeared but there still may be a few under extremely high rootworm pressure.

By year 3 after inoculation, all the hotspots should disappear.

What is the best application window for Biocontrol Nematodes to achieve the best rootworm control?

Persistent Biocontrol Nematodes have a wide application window due their ability to persist across long periods when host insects (prey) are not present.

The longer time between the application of Biocontrol Nematodes and the presence of the target insect, the better the year 1 activity.

As an example, rootworm typically hatches around June 1. An early May application usually results in better year 1 control than a late-May application.

Recent field data also shows that a Biocontrol Nematode application the previous September results in a significant better year 1 activity against rootworm than an early May application.

Should I use a soil insecticide with my traied corn in the year of application of BC nematodes?

Since year 1 activity of Biocontrol Nematodes ranges from 60%-80%, the use of a soil insecticide at planting frequently has benefit for the farmer by increasing the yield recovery for reduced root damage.

Does Biocontrol nematodes benefit traits which are not failing as much as failing traits?

The beneficial role of Biocontrol Nematodes changes when used with a failing RW trait vs a RW trait which is newly introduced or still providing a good level of root protection.

With the failing RW trait, the presence of Biocontrol Nematodes reduces the level of rootworm feeding damage and there is a yield recovery from the reduced root damage.

For a fully functioning RW trait, Biocontrol Nematodes target the survivors of the RW trait (yes, there are survivors), resulting in a delay of the rootworm resistance development and an increased durability of the RW trait. **Said simply, Biocontrol Nematodes enable a RW trait to last longer before resistance emerges.**

Will the new RNAi toxin save us from rootworm?

by Persistent BioControl Blogs

What is RNAi?

RNAi is a biological process that interrupts the function of messenger RNA (mRNA), which carries DNA's instructions for making new critical proteins.

These small pieces of RNA bind the messenger RNAs required to code the critical proteins required by the insect.

How does RNAi work on rootworm?

When rootworm larvae ingest root tissue containing the RNAi toxin, the small pieces of RNA exit the insect gut and enter into the body cavity where these small pieces of RNA begin binding with critical messenger RNA.

Messenger RNA's function is to regulate the production of critical insect protein required for insect growth and development. After ingesting the toxin, rootworm death follows in about 7 days, depending on the actual amount of toxin ingested.

Why does root feeding/damage by rootworm continue until death after consumption?

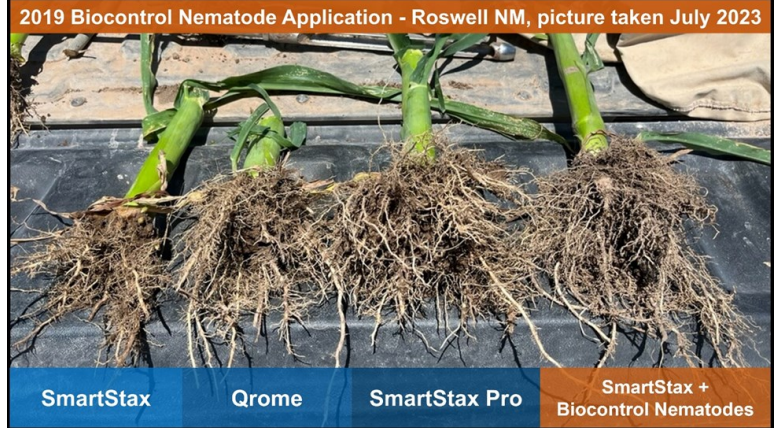
Death from RNAi ingestion is a slow process, requiring about 7 days. It takes time for the small pieces of RNAi to bind and disrupt the messenger RNA, sufficiently prevent critical protein production and cause death.

During this time, the rootworm continues to feed, causing more root damage before death.

How does RNAi toxin mode of action differ from Bt-RW?

Bt susceptible rootworm (back in the beginning), stopped feeding after ingesting a small amount of Bt toxin. Although death requires about 7 days, susceptible rootworm do not continue to feed.

As rootworm larvae became more resistant to Bt-RW, the level of feeding increased until the larvae ingested a large enough amount of the toxin to die.



Highly resistant rootworm larvae continue to feed and complete development, causing the high level of root damage currently occurring in many continuous corn fields.

How quickly will rootworm develop resistance to RNAi?

In laboratory studies, field collected rootworm developed resistance in 2 generations which is equivalent to two growing seasons. Click [here](#) to download the full 2018 Monsanto paper.

- The source of these rootworm were the surviving beetles from a 40 ac field with a record of Bt-RW failure and planted to corn containing RNAi.
- Clearly, this new toxin is susceptible to rapid rootworm resistance development without careful management. Commercially, SmartStax Pro™ and Vorceed™ are the corn seed containing this new RW toxin.
- As a result of this high rootworm potential resistance, growers and consultants should seriously consider incorporating an integrated rootworm management approach to help preserve the effectiveness of this new toxin.

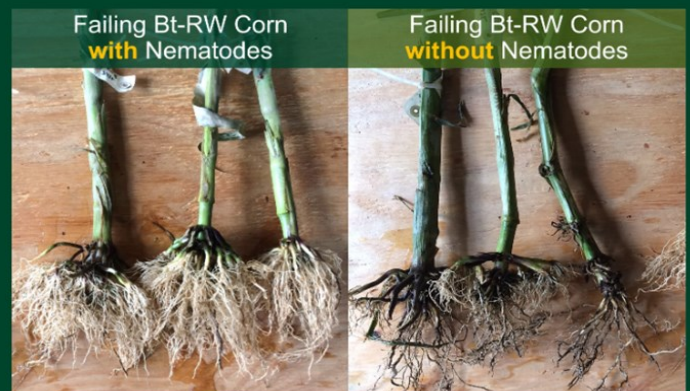
Fight Back Against Resistance

At Persistent BioControl, we produce insect attacking nematodes that kill corn rootworm before they can damage your corn.

Our nematodes are microscopic worms that live in the soil. Just one application will protect your failing Bt-RW traited corn for multiple growing seasons.

Our product can be applied through any center pivot or spray rig - no special equipment required. And you can apply anytime the soil temperature is above 50F.

Explore the Science.



<https://www.persistentbiocontrol.com/>

Join us!

Power of Manure Project

How much N can my soil provide?
 How do past manure and management
 impact soil N supply?
 Can microbial biomass predict soil N supply?

Protocol:

Farm implements no-sidedress "stamps" or strips (two harvester's width-wide, >150 ft long)

We will evaluate soil microbial biomass, soil fertility, silage or grain quality, yield, CSNT, and N uptake

We are looking for participants for the 2025 growing season! Interested?

Juan Carlos Ramos (jr2343@cornell.edu)
 Quirine Ketterings (qmk2@cornell.edu)



A project of the New York On-Farm Research Partnership

Value of Manure Project 2025

Research questions:

- How much nitrogen can be credited to manure?
- What is the yield impact of fall or spring manure applications in grain and silage corn?
- What is the microbial biomass impact of manure application?

Background: Manure has all seventeen essential plant nutrients and can increase yield beyond what can be obtained with fertilizer only. In this project, we evaluate the nitrogen fertilizer replacement value (how much N can we credit to manure?) and yield differences as a result of manure application. This project is funded by the New York Farm Viability Institute (NYFVI) and the Northern New York Agricultural Development Program (NNYADP). **We are looking for farmer participants.** We can test any type of manure you are interested in evaluating (liquid, separated, solids, compost, etc.) and any application method and timing. Interested? Contact Juan Carlos Ramos (jr2343@cornell.edu), On-Farm Research Coordinator for the NMSP.

Required for participation:

- Corn harvester (chopper or combine) with calibrated yield monitor system.
- Trial plot should get 20-30 lbs N/acre as starter only (no broadcast fertilizer N).
- Field size: length minimum of 1200 feet. Field width minimum of 12 times the harvester width. Trial area should be as homogenous as possible.
- Ideally 3rd or 4th year corn where N fertilizer is expected to be needed for optimal yield but otherwise with optimal fertility (pH, P, K, etc.).
- Sidedress unit that can apply up to 175 lbs N/acre in 35 lbs N increments (0-35-70-105-140-175) per the trial plot plan (below, Figure 2).
- Manure application equipment (surface application, incorporation, or injection) and your preferred manure type (liquid, separated liquids, solids, compost, digestate, etc.).

Access the complete protocol here:
https://nydairyadmin.cce.cornell.edu/uploads/doc_1126.pdf

Power of Manure Project 2025

Research questions:

- How much nitrogen (N) can my soil supply?
- How does past manure, crop, and soil management impact soil N supply?
- Can soil microbial biomass predict soil N supply on my farm?

Background: Manure history and field management (cover crops, crop rotation, etc.) impact soil nitrogen (N)- supplying capacity. In this project, we evaluate the N supply, soil microbial biomass, and crop N uptake efficiency as a result of different manure histories, field agronomic management, and soil types. This is a project of the New York On-Farm Research Partnership of the NMSP, co-funded by the Northern New York Agricultural Development Program and the New York Farm Viability Institute. **We are looking for farmer participants.** We can test soil N supply in one or several fields under different agronomic managements (cover crops, no-till, etc.). Interested? Contact Juan Carlos Ramos (jr2343@cornell.edu, 531 207 6339), On-Farm Research Coordinator for the NMSP.

Required for participation: • Corn harvester (chopper or combine) with calibrated yield monitor system.

o Alternatively, the plots can be hand-harvested by the NMSP team.

- Corn planted with no more than 30 lbs N/acre as starter fertilizer.
- Field length minimum: 500 ft. Field width minimum: 6 times the harvester width.

Access the complete protocol here:

https://nydairyadmin.cce.cornell.edu/uploads/doc_1126.pdf

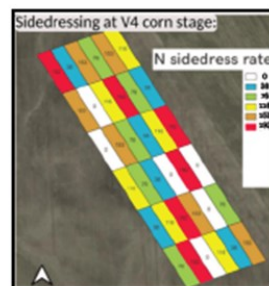
Join us!

Value of Manure Project

If I use manure:
 How much can I save on fertilizer \$\$?
 Will my corn yield increase?

"This study helps us put a number on the value of manure. It was very easy to implement without taking my time away."

Andy Miller, Osterhoudt Farms



We are looking for participants for the 2025 growing season! Interested?

Contact Quirine Ketterings (qmk2@cornell.edu) or Juan Carlos Ramos (jr2343@cornell.edu)





Cornell Cooperative Extension

South Central NY Dairy and Field Crops Program

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Upcoming Events Calendar

March 18	Agri-Economic Development Summit: Growing Our Future in Cortland County https://scnydfc.cce.cornell.edu/event.php?id=2573
March 19	Colostrum and Calf Technologies - Cost: \$30/person, Dairy One, Ithaca https://scnydfc.cce.cornell.edu/event.php?id=2577
March 20 1-3 pm	Sprayer Clinic 2DEC Credits for 1A & 21-25 Dryden VFW, 2272 Dryden Road https://scnydfc.cce.cornell.edu/event.php?id=2559
March 20 6:30 social 7 pm Dinner	Cortland County Agriculture Celebration Banquet at the Hathaway House, Solon Cost: \$25/person https://scnydfc.cce.cornell.edu/event.php?id=2574
March 20 9:30 am—3pm	Transition Calf Workshop—Tompkins County Elm Tree Inn in the am. Millbrook Farms pm Cost: \$25/person https://scnydfc.cce.cornell.edu/event.php?id=2578
March 27 9:30 am—3pm	Transition Calf Workshop—Cayuga County Patterson Farms Inc.; 112 Townline Rd., Auburn Cost: \$25/person https://scnydfc.cce.cornell.edu/event.php?id=2579
March 28 1-3 pm	Planter Clinic—Musgrave Research Farm; 1256 Poplar Ridge Road, Aurora, NY https://scnydfc.cce.cornell.edu/event.php?id=2560

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