SCNY Dairy & Field Crops Digest

Cornell University
Cooperative Extension
South Central New York Dairy & Field Crops Team

CROPPING NOTES

Janice Degni, Area Extension Field Crops Specialist

It's been an interesting crop season so far. As I write this second cutting is well underway, oats are headed and moving towards dry down and wheat is being harvested. We have corn that is tasseling and corn barely knee high. Soybeans are a mixed bag. The early wet and cool conditions delayed planting had them off to a slow start. The early beans are well into flower. There has been no sign of heavy aphids but that is something to watch for through late August.

It has been a light year for insect pests. No major infestations have been reported. We've had enough rain and humidity that watching for plant diseases like Northern corn leaf blight and grey leaf spot in corn is important. One of the most common issues in corn this year has been uneven germination in stands. Populations may be good but there are large and small plants often within the same row. There are a number of potential causes for this including; planting into cloddy seedbeds, crusted seedbeds, cold or herbicide injury, nutrient deficiency, and low pH. I've seen examples of each of these possible causes this year. I have included several articles that address the early season challenges we've had this year including emergence issues, ponding & saturated soils and their impact on nitrogen loss.

How does this season stack up for temperature, moisture and growing degree days? As you know heat units drive plant growth so let's compare the relative accumulation of growing degree days (86/50 base) for different planting dates and compare to maturity stages in corn.

Table 1. Accumulated GDD's (86/50)

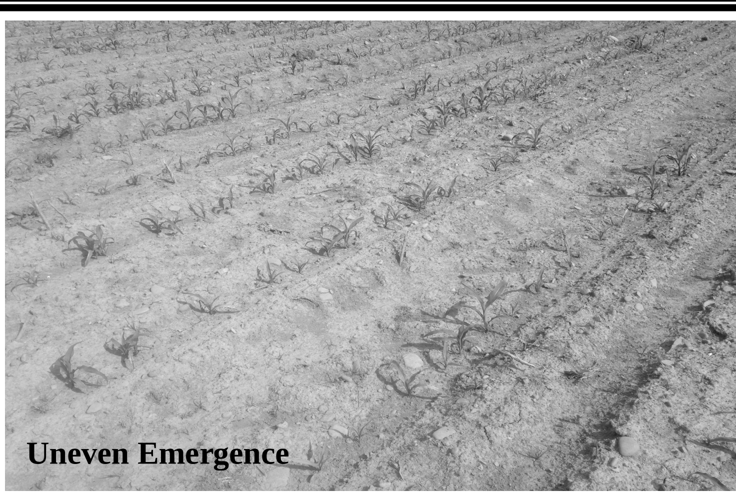
Planting Dates:	April 15	May 1	May 15	June 1
April	70			
May	368	298	169	
June	850	780	681	482
July*	1317	1247	1148	949

*through 7/24/14
Growing degree days are calculated by taking the average daily temperature - 50°. High temperatures are capped at 86° and lows at 50°.

AVG. GDD ACCUMULATION FOR CORN DEVELOPMENT STAGE FOR NEW YORK

GROWTH STAGE	80 DAY HYBRID	110 DAY HYBRID
EMERGENCE	110	110
SILK STAGE	1,100	1,400
½ MILK LINE	1,800	2,400
MATURITY	1,900	2,500

Source: Cox, W.J. 1992. Corn Maturity and Development



Uneven Emergence

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AUGUST 2014
Cornell Cooperative Extension South Central NY Dairy & Field Crops Program

PI Counts: Explanation and Troubleshooting

By Betsy Hicks, Dairy Specialist

Take a look at your milk check and find the quality premium section. Probably there are a more than one criteria for getting the highest premium possible, and one of those just may be Preliminary Incubation Count, or PI Count. Numerous times producers have asked me just what PI Counts are and how they can keep PI Counts low to maintain their quality premiums. PI Counts can be extremely frustrating, but understanding the test and what it measures is the first step to controlling this part of your milk check.

By definition, Preliminary Incubation Count is a test that pre-incubates raw milk at 55°F for 18 hours before a Standard Plate Count is performed. This number is then compared to the Standard Plate Count that was performed on the same sample of milk when raw. Standard Plate Counts estimate the density of bacteria in a sample of milk, typically in 1,000 coliform forming units (cfu) increments per 1 mL of milk. Steven Murphy of Cornell University explains that PI Counts are used based on the theory that the bacteria already present in the cow will not multiply under the incubation used during the PI test. Any other bacteria, however, may grow and significant increases in the count may show that there was contamination of the milk sample after it left the cow. This contamination could be from any number of things such as dirty equipment, dirty cows, problems cooling the milk sample, etc. As Murphy states, "the Preliminary Incubation Count has been used to test for the possibility of farm production methods in need of improvement that are not detected by the Standard Plate Count Method".

One reason that PI Counts are so frustrating is the fact that it usually takes several days before the test result shows up on your quality report. By the time your milk inspector shows up or you see the increased PI count yourself, the problem may have already fixed itself. You and your milk inspector may tear apart your milking system and find nothing out of the ordinary. The piece of equipment that was dirty finally got cleaned during normal wash, or the problem was not in the milking system at all. PI Counts can also be elevated from improper cooling – even if the milking personnel forgot to turn the tank on for only 15 minutes. As we're coming into warmer weather, producers should make sure tanks are cooling properly and in a timely manner. It should take no more than 2 hours after completion of milking to cool to 40°F. Any deviation from your normal cooling period should be inspected, as problems may occur when summer temperatures get really warm.

Other areas to keep on top of to control PI Counts are sanitizing both the milking system and bulk tank before milking. This simple step can do a lot to minimize both bacteria counts and PI counts. Along with that idea, a good practice to do at the start of milking when the tank is empty is to inspect the inside of the bulk tank with a strong flashlight. The agitator especially should be turned so that both sides of the paddle can be seen. Most times on PI calls, there is a slight buildup in the tank, either in a corner or on the agitator paddle that is the culprit. A vigorous brushing will probably be necessary to remove it, but daily inspections of the tank should ensure that a buildup will not happen. The tank is where milk sits the longest and in most cases, this is where I would start investigating when PI is out of line.

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We are pleased to provide you with this information as part of the Cooperative Extension Dairy and Field Crops Program serving Cortland, Chemung, Tioga and Tompkins Counties. **Anytime we may be of assistance to you, please do not hesitate to call or visit our office.**

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UNEVEN EMERGENCE IN CORN

Paul R. Carter, Emerson D. Nafziger, Joe g. Lauer

If soil conditions are not ideal at planting, corn may emerge unevenly. You might eventually get a full stand, but competition from the larger, early-emerging plants will decrease the yield of smaller, late-emerging plants. This publication will help you evaluate whether you'll gain more by protecting small plants, replanting stands, or filling in poor stands.

Emergence time may vary between parts of fields, from one row to the next, or from one plant to the next.

Why Corn emerges unevenly

The most common cause of uneven emergence in corn is dry soil. If the soil is too dry at or shortly after planting, seedlings will emerge at different times. Emergence time may vary between parts of fields, from one row to the next, or from one plant to the next. Soil moisture can differ within a field because of differences in soil type or topography, or from uneven distribution of moist and dry soils by secondary tillage. Cloddy seedbeds caused by working the ground when it's too wet can mean poor contact between seed and soil. As a result, some seeds absorb enough moisture to germinate while others remain dry. In many cases, seeds placed in dry soil don't germinate and emerge until after rainfall. This produces a mixture of larger and smaller plants with plant size differences depending on time from planting to rainfall.

Uneven soil temperature is another cause of uneven corn emergence. Seed-depth soil temperatures can vary if crop residues from reduced tillage systems aren't distributed evenly, if seed depths vary, and if soil within fields varies in type and topography.

Corn may also emerge unevenly because of variable soil crusting, herbicide injury, or because of insects or diseases.

Finally, uneven corn emergence occurs when corn growers, with stand loss or uneven stands, replant by "filling in" the existing stand, rather than tearing up the field and starting over.

Recommendations:

The first step in using the following recommendations is to determine the general pattern of emergence. This will vary both from field to field and within parts of fields. Thus, you can change management for particular fields or parts of fields depending on the most prevalent emergence patter.

Should you protect late-emerging plants during row cultivation?

- If late-emerging plants are within 1 ½ to 2 weeks of those emerging early, avoid burying them during cultivation.
- Protect plants emerging 3 weeks late if at least half of the plants in the stand are late-emergers.
- If less than one-fourth of the stand is emerging 3 weeks late or later, it probably won't pay to encourage their survival. Yields will be about the same whether or not these delayed plants are buried.

Should you replant stands with uneven emergence?

- If unevenness is mostly row-to-row, replanting will probably not increase yield.
  - If the delay in emergence is less than 2 weeks, replanting will increase yields less than 5%, regardless of the pattern of unevenness.
  - If at least half of the plants in the stand emerge 3 weeks late or later, then replanting may increase yields up to 10%. To decide whether to replant in this situation, estimate both the expected economic return of the increased yield compared to your replanting costs and the risk of emergence problems with the replanted stand.

Should you fill-in a poor stand?

When replanting a poor stand (three-fourth stand loss or greater), you can either tear up the stand and replant the whole field, or fill-in existing stand and create uneven emergence.

- If you replant with 2 weeks of planting the original stand, filling-in the existing stand may be an option. Yields will be similar to those from a uniform-emerging, replanted stand, if you can get relatively uniform plant spacing within the row between old and new plants. However, within 2 weeks of planting, it may be too early to determine what the final stand will be.
- If you replant 3 weeks after the initial planting, yield potential is about 10% greater if you tear up the field and start over with an even-emerging stand. Balance this possible yield increase against the additional cost of tillage, seed, pesticide, and dryer fuel.

Other considerations:

- It may be useful to evaluate non-uniform emergence by comparing growth stage differences between early and delayed emerging plants rather than time differences. The 1 ½ and 3-week planting delays described in this bulletin resulted in similar time delays in emergence. However, emergence delays may vary with different environments and the actual time delays may not be known. You can use figures 1 and 3 to help relate growth-stage and appearance differences between uneven emerging plants to the time delays described in this bulletin. For example, at emergence of plants delayed in planting by 1 ½ weeks, there were four to five visible leaves on early plants. When plants delayed 3 weeks in planting emerged, there were seven to nine visible leaves on early plants.

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- If plant-to-plant competition is low, late-emerging plants will yield more. For example, at plant densities under 20,000 plants/a, late-emerging plants will probably contribute more to yield than the proportions shown in figure 2. However, when plant densities are below 20,000 plants/a, fields will not produce top yields.
- In this study, the uneven emerging stands yielded less primarily because of direct competition of plants of two different ages next to one another. Older plants generally have an advantage in obtaining light, water, and nutrients. In some cases, late-emerging plants could be more vulnerable to silk clipping by corn rootworm beetles. Beetles may attack fresh silks of late-silking plants, cutting the silks as soon as they emerge, preventing pollination and reducing kernel set.
- Late-emerging plants had higher grain moisture content at harvest. This could result in grain with varying moisture levels, which would increase kernel damage and drying costs. They also often had smaller stems, weaker stalks, and fewer brace roots, so they lodged more. Also, at harvest it's difficult to adjust combines for the variable ear sizes between early and late plants. These problems would be minimal with a 1/1/2-week delay, but could be serious with a 3-week delay.

Avoiding uneven emergence

Corn sometimes emerges unevenly because of environmental factors that corn growers can't control. Nevertheless, the following management practices can help you avoid uneven stands:

- Avoid excessive tillage trips which dry or compact the seedbed.
- Remember that tilling when soils are too wet can produce cloddy soils, a major cause of uneven stands.
- Dig up some seeds during planting to monitor seed placement. If contact between seed and soil is poor or seeding depth isn't uniform, adjust seed openers and/or press-wheel tension. Secondary tillage operations may need to be changed to improve soil conditions for more uniform planting.
- If you are using a tillage system that retains substantial crop residue on the soil at planting, adjust tillage and planting equipment so residue cover over the row area is uniform after planting.
- Follow recommended herbicide application guidelines to avoid injuring corn.
- After planting, closely monitor corn emergence and use a rotary hoe if a soil crust is keeping corn from emerging uniformly.

(Continued from page 2)PI Counts….

It should go without saying, but another area that can sneak up on producers is replacing worn or cracked rubber parts. Producers in general are pretty good about replacing inflations on a regular basis, but how often are milk hoses and other lines inspected? Any area where milk passes through that should be but cannot be sanitized (think cracked, old or worn-out rubber) are prime areas for PI counts to be an issue. If it's been a while since you've replaced your other rubber parts, take a look at them especially if your PI counts are higher than you'd like.

If you have questions or would like to troubleshoot milk quality problems, I can visit your farm to help!

DIAGNOSING CORN EMERGENCE AND SEEDING GROWTH PROBLEMS

Few problems cause as much anxiety among crop producers as having a poor stand of corn, or corn plants that look sickly after emergence. The cost of planting corn is so high that failure is very expensive. When this happens, the first step is to start looking for the cause of the problem.

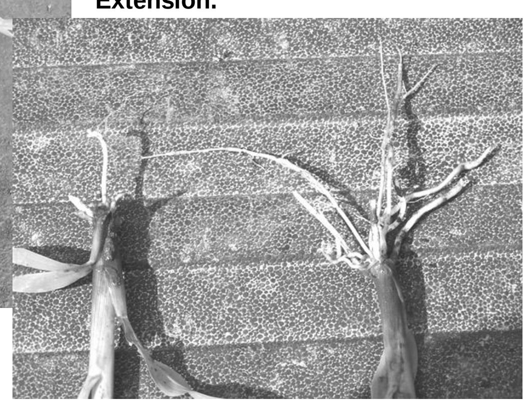
What are the most common causes of emergence problems or poor seedling growth? There can be several possible causes. If there is poor seedling emergence, start by looking for patterns. Whether the emergence problems are occurring in small but regular skips across the field, uniformly throughout the field, only in localized areas, or in random scattered areas could be a clue to the cause. Here are just a few of the possible scenarios:

- A uniform pattern of skips suggests a clogged, jammed, or broken planter.
- If the field has an uneven pattern of emergence, you'll have to do some digging in the areas with emergence problems. If there is a hole where the seeds were placed, an empty seed coat at the bottom of the hole, and a little pile of soil next to the hole, you might suspect rodent damage.
- Soil insects can also cause patterns of non-uniform emergence. Several insects attack planted seed, destroying the germ or feeding on the geminating tissue. When cool temperatures delay germination, the risk of damage increases as the seed is exposed to a longer feeding period by insects. Possible culprits include seed corn beetles, seed corn maggots, and wireworms. Check to see if the seed had been treated with a seed-applied or planting-time insecticide. If so, insect damage is less likely to be the cause of the problem. If not, soil insect damage is a possibility.
- Uneven patterns of emergence may also be caused by prolonged waterlogging in low-lying areas of the field.
- If emergence problems are relatively uniform throughout the field, you may find that soil surface crusting has prevented emergence. This can be easily verified by a little digging. If seedlings cannot push through the soil surface crust, you should find malformed seedlings just beneath the soil surface.
- Poor emergence or uneven emergence can result from planting early corn too shallowly, and not having all the seed planted into adequate moisture for germination. This seems to occur most often in no-till, where variation in residue cover causes variable surface moisture. Planting too deeply can also result in poor emergence and stand establishment, especially if soils are crusted.
- If the plants emerged in good fashion, but the seedlings then have problems maintaining adequate growth and development or leaf color, there may be several possible reasons. A few of the most likely causes include:
  - Compacted soil or waterlogging. Wet soils and unusually cool temperatures can inhibit root growth especially, slowing plant development. This can cause yellowed, wilting plants due to poor root growth, drowning, or a seedling blight infection. Seedling blight is often characterized by stem tissue near ground level that is discolored or water-soaked in appearance. Also, planting in wet soil can compact the seed furrow, inhibiting root growth. A shallow compaction layer can slow early root growth, resulting in stunted, nutrient deficient plants.

Figure 1. Sidewall and seed zone compaction in heavy clay soil. Photo by Stu Duncan, K-State Research and Extension.

Early-season lodging. This is usually associated with hot, dry weather during V1 to V6, which prevents adequate development and penetration of nodal roots. Plants can survive for a time on just the seminal root system, but they will have little mechanical support. Reasons for poor nodal root development and an elevated crown include sidewall compaction, erosion after emergence but before nodal root development, and sinking of the seedbed due to pounding rains. Often a good soaking rain is enough to allow nodal roots to establish and plants can recover. Inter-row cultivation can be used to push soil against plants with exposed crowns.

Figures 2 and 3. Corn seedling lodging caused by shallow planting and poor nodal root development (plant on left). Photos by Doug Shoup, K-State Research and Extension.



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- White grubs or wireworms. These soil insects may be eating the roots, which will cause the plants to wilt.
- Black cutworms. These insects, which can be found in the soil or on the surface, cause "window paning" of the leaves on young plants. Cutworms may also cut off seedling plants at the soil surface.
- Flea beetles. These tiny leaf-chewing insects can cause "scratches" on leaves. Eventually, the leaves may shrivel, turn gray, and die. Plants are more susceptible to flea beetle injury when temperatures are cold and seedling growth is slow. Seedling plants are often able to recover from flea beetle injury because the growing point remains below ground level until the fifth leaf emerges.
- Chilling injury (cold weather crown rot). When this occurs, plants are stunted and may display nutrient deficiency symptoms. Root development is usually normal, but the crown will have dark brown or black discoloration, which can be seen by splitting the stem. This kind of injury is associated with unusually cool temperatures from emergence to V4 – not freezing, but close to it. Symptoms are similar to Stewart's Wilt, so check for flea beetle feeding, which is the vector for this disease.
- Freezing temperatures. A freeze that occurs after emergence can cause leaves to first appear water soaked, then turn white within a few days. A freeze can kill leaves. Plants will recover from this if the freeze occurs before the fifth leaf emerges because the growing point is still underground. Plant roots are undamaged by a freeze. If the weather warms back up sufficiently after the freeze injury occurs, chances of plant survival are increased. If it stays unusually cool and wet, crown rot can occur. In rare cases, such as the "Easter" freeze of 2007, temperatures can get low enough to damage the crowns below the soil and kill the plants.

Figure 5. Corn after a hard freeze caused 25% stand loss in this case. Photo by Stu Duncan, K-State Research and Extension.

Figure 6. Seedlings damaged after starter fertilizer containing urea-N was placed in direct seed contact. Photo by Dorivar Ruiz Diaz, K-State Research and Extension.

Figure 7. Potassium deficiency on corn in cold soils. The edges of the leaves are chlorotic. Photo by Stu Duncan, K-State Research and Extension.

Save the Dates:

CALF CARE WORKSHOPS

Date: Oct 28, 30, Nov 4, 6 evening sessions
Time: 6:30 – 9 pm
Location: To be announced

The SCNY Team is excited to take part in a shared program focusing on Calf Care in NY.

Topics include:

- Young Calf Care
- Impact of Environmental Factors
- Calf Nutrition and Delivery
- Calf Management Issues

In addition, the program will include a day session on a local dairy to provide hands-on training and techniques.

Cost for all 4 night sessions plus the day training session is only $50. Please RSVP to Sharon at (607) 753-5078 or shv7@cornell.edu.

If you have questions, please call Betsy Hicks, Area Dairy Specialist at (518) 428-2064 or bjh246@cornell.edu.

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Impact of Ponding and Saturated Soils on Corn

By: Peter Thomison

Persistent rains during the past several weeks have resulted in ponding and saturated soils in many corn fields and lead to questions concerning what impact these conditions will have on corn performance.

The extent to which ponding injures corn is determined by several factors including: (1) plant stage of development when ponding occurs, (2) duration of ponding and (3) air/soil temperatures. Corn is affected most by flooding at the early stages of growth. Once corn has reached the late vegetative stages, saturated soil conditions will usually not cause significant damage. Since most corn in Ohio is approaching the silking stage, this bodes well. Although standing water is evident in fields with compacted areas, ponding has usually been of limited duration, i.e. the water has drained off quickly within a few hours, so the injury resulting from the saturated soil conditions should be minimal. Moreover temperatures have been moderate.

However, under certain conditions saturated soils can result in yield losses. Although plants may not be killed outright by the oxygen deficiency and the carbon dioxide toxicity that result from saturated soils, root uptake of nutrients may be seriously reduced. Root growth and plant respiration slow down while root permeability to water and nutrient uptake decreases. Impaired nutrient uptake may result in deficiencies of nitrogen and other nutrients during the grain filling stage. Moreover, saturated soil conditions can also result in losses of nitrogen through denitrification and leaching.

Past research at Iowa State University evaluated flood damage to corn that was inundated for variable periods of time at different stages of growth (including silking). Two different N levels ("high" N - 350 lb N/ac vs. "low" N-50 lb N/ac) were also considered to determine how N affected corn response to flood injury. Low N plots yields were reduced by 16% at silking when plots were flooded for 96 and 72 hours. In the high N plots, flooding at silking had little or no effect on yields.

Source: http://agcrops.osu.edu/corn/newsletters/2013/2013-21/impact-of-ponding-and-saturated-soils-on-corn

Corn Roots, Wet Soils, and Nitrogen

By: Emerson Nafziger

Standing water and wet soils can badly damage a rapidly-growing corn crop. With the crop planted early and developing rapidly under high temperatures, standing water resulted in serious and irreparable damage to root systems. This lowered yields in low-lying fields and parts of fields, even where rains fell later in the season.

When soils remain saturated for more than a day or two, the lack of oxygen causes nutrient uptake to slow quickly, and root tips start to die off. It helps that temperatures have not been above normal; cooler water carries more dissolved oxygen, and also slows growth and nutrient uptake. Also, plants during vegetative growth have much better ability to grow back damaged root systems once soils drain than do plants during or after pollination.

These factors, along with the very good crop color (which indicates good root activity and adequate supplies of soil N) before the rains in late June, point to good chances for recovery of crop yield potential in fields and parts of fields where the water is no longer standing. In the short run, plants may lose some of their green color before roots are fully functional again, but this will likely be a temporary condition. While many worry that any stress during mid-vegetative growth will lower yield potential, there's not much evidence that a few days with reduced photosynthetic rates has much effect on yields, at least if this occurs more than a week before tasseling.

Regardless of how quickly the crop returns to normal after an event like temporary flooding, questions will remain about how standing water might affect the amount of nitrogen left in the soil to meet the needs of the crop. Warm, saturated soils lose nitrogen (as gas back into the air) through the process of denitrification. We do not think that such losses have been very large in most fields, given the temperatures and the fact that most flooding was temporary. In better-drained fields, denitrification would be less, but percolating water has probably moved some of the nitrate-nitrogen deeper, perhaps below the root system or into tiles lines.

By the time corn accumulates 1,000 GDD, reaching about stage V13, it has accumulated about 20 percent of its dry weight and about 40 percent its season-long nitrogen accumulation (Abendroth et al., 2011) During this period the crop takes up 3 to 3.5 lb of N per acre per day, and by the time of pollination, it will have taken up about 60 percent of its nitrogen and produced about 40 percent of its dry weight. At the time the crop reaches stage V13 (about head-high), it still has to take up 110 to 120 lb of N, and in years when June is wet, a common question is whether or not the crop might

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run out of nitrogen, leaving the crop short. While the need for 20 or more lb of N per week would seem to raise the possibility of a shortage, the production of plant-available N from soil organic matter through the process of mineralization is also at its maximum rate in mid-season.

For a crop with a good root system growing in a soil with 3 percent organic matter, mineralization at mid-season likely provides at least half the N needed by the crop on a daily basis. This means that normal amounts of fertilizer N, even if there has been some loss, should be adequate to supply the crop.

Though we could measure soil N present or apply urea by air on the wetter field or parts of fields where the crop shows deficiency, it would seem prudent to wait to see if the crop recovers its green color before going to this expense. The loss of crop color in wet soils is due mostly to loss of root function, and roots will need to recover before the canopy does. Even without adding more N, odds are good that the crop will recover and thrive in the coming weeks, providing the weather remains favorable.

Reference:

Abendroth, L.J., R.W. Elmore, M.J. Boyer, and S.K. Marley. 2011. Corn growth and development. PMR 1009, Iowa State University Extension, Ames, Iowa.

Spring and Winter Small Grains: A Viable Option to Extend the Grazing Season

By: Paul Cerosaletti and Lisa Fields

Why Consider These Grains?

Grazers are often looking for crops and management techniques to extend the grazing season, or fill in during traditional perennial forage growth "slumps". An often overlooked and very viable option to do this is with winter and spring small grains. These grains include oats, spring triticale, winter rye and winter triticale. Triticale is a cross between rye and wheat. Other small grains such as wheat and barley can be used, but the other small grains are better choices for our soils and climate.

One reason to consider these grains is that they grow well at the "ends" of the growing season, sprig and fall, and produce forage when temperatures are very cool. Winter small grains, sown in the late summer/early fall grow well into the fall, and are the first green forage growing as snow melts away. Spring grains, can be sown in early-late spring to provide forage in late June-early August, or can be sown in late July-August for an abundant fall crop.

Another reason for growing small grains for grazed forage (or even mechanical harvest) is that their forage quality is excellent, rivaling protein content of legumes and fiber digestibility of Brown Mid Rib crops (corn; sorghum-sudangrass). Tables 1 and 2 below presents the forage quality data from several on farm small grain crops in Delaware and Schoharie County over the last 5 years.

Table 1. Selected winter rye and triticale forage quality measures for Deleware and Schoharie Counties crops, 2001-2006.

Sample	Harvest Date	Height Inches	DM	NDF	Lignin, %NDF	NDF-D 24 hr[2] %NDF	CP %DM	Sugar %DM	NE-1 Mca/lb
Grazed[1]	May 1 avg.	15	20	42	704	72	19	25	0.78
Mechanical Harvest[1]	May 16 avg.	32	21	59	5.6	59	13	15	0.61

[1] Grazed n=5, Mechanical n=5 [2] 24 hour NDF digestibility

Table 2. Selected oat forage quality measures for Delaware County crops, 2005

Sample	Harvest Date	Height Inches	DM	NDF	Lignin, %NDF	NDF-D 24 hr[3] %NDF	CP %DM	Sugar %DM	NE-1 Mca/lb
Grazed[1]	July 25	24 (headed)	22	58	808	56	17	10	0.63
Mechanical Harvest[2]	Nov 1	20	20	42	9.2	78	23	8	0.78

[1] Grazed n=1, Spring Seeded [2] Mechanical n=2, fall seeded [3] 24 hour NDF digestibility

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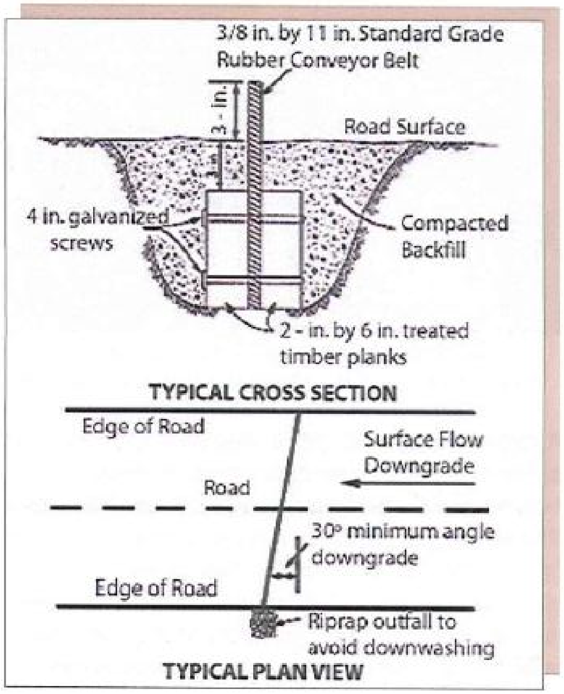

USDA Forest Service

Additional Practices to Stabilize Roads

Other practices can also be installed to manage surface water and reduce erosion of roads.

- Water Boxes
- Broad-based Dips
- Box & Pole Culverts

Please contact your local SWCD for technical assistance with these practices.

For More Information

The staff of the Skaneateles Lake Watershed Agricultural Program (SLWAP) and County Soil & Water Conservation District (SWCD) in your area can provide technical assistance on implementing deflectors in access roads.

Skaneateles Lake Watershed Agricultural Program (SLWAP)
2571 Route 11, Suite 3
LaFayette, NY 13084
Phone: (315) 677-4630

SOIL AND WATER CONSERVATION SOCIETY

Onondaga County SWCD
Phone: (315) 677-3851

Cortland County SWCD
Phone: (607) 756-5991

Cayuga County SWCD
Phone: (315) 252-4171

Brochure developed by Cornell Cooperative Extension of Onondaga County, with technical support provided by SLWAP (March 2009)

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Water Deflectors

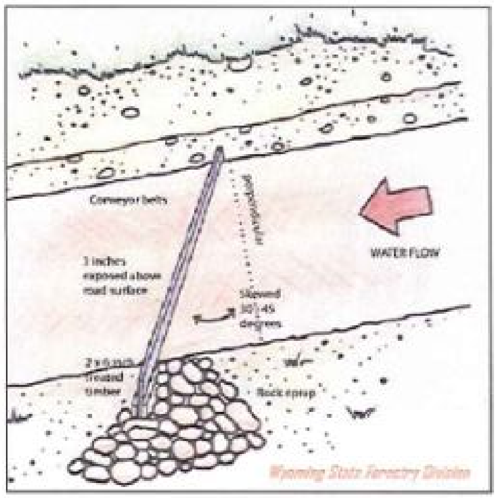
Managing Surface Water and Reducing Erosion on Unpaved Roads

SOIL AND WATER CONSERVATION SOCIETY

Funding Provided by the City of Syracuse Department of Water

and a Mini-Grant from the Empire Chapter of the Soil and Water Conservation Society

'ver the past few years, there have been some werful summer storms. The accompanying avy rains can make for real "gully washers" in eams, ditches, and camp roads all around the e. A common occurrence on unpaved access ads is the scouring and washing off of the road face into the adjoining landscape. Eventually, lly formation makes the road nearly impassable vehicles and equipment. To address this itter, staff of the Skaneateles Lake Watershed ricultural Program (SLWAP) have been installing ter deflectors in unpaved access roads to divert ter off the road and prevent erosion.



Rubber water deflectors are installed across an access road to reduce water gullies and erosion.

Benefits of Water Deflectors

Helps to divert water off access roads

Reduces erosion and formation of gullies

Allows vehicles and equipment to pass over without interference

Suitable on unpaved, low maintenance, gravel or earthen roads (such as farm access roads, camp roads, forest roads, or other seasonal use roads)

What is a Water Deflector?

A water deflector is quickly and simply constructed from a length of standard-grade rubber (made from a used conveyor belt) that is sandwiched between two treated, wooden 2" x 6" planks. Multiple, 4-inch galvanized screws help to secure the rubber belt between the planks.

Supplies Needed

- ☐ 2" x 6" treated lumber planks (Two planks per deflector)
- ☐ 3/8" thick by 11" wide standard grade rubber **length needed is determined by width of road* (used conveyor belt rubber is suitable – most earthwork contractors have connections with local quarries and can help you locate a source of rubber)
- ☐ 4-inch galvanized screws
- ☐ 4-6" limestone rip rap
- ☐ Seed & mulch (for disturbed area after construction)

Typical material costs of a deflector are between $50 and $100, assuming you have a used rubber conveyor belt. The actual cost is dependent on the length and number of deflectors needed. Installation costs are extra, but can be easily accomplished with a small excavator or rubber-tired backhoe.

The water deflector is installed into an excavated trench in the access road so that a minimum of three inches of the rubber belt is exposed above the road surface. (Note: Deflectors are typically installed on seasonal roads. Extra care must be taken if activities such snowplowing or road grading will occur that could damage the exposed rubber.) The deflector must be installed at a 30-degree down-slope angle to the road in order to ensure that water flows off the road and remains clean.

Water deflectors are installed so that 3 inches of rubber belting extends above the surface of the road.

A rock-stabilized (rip-rap) outfall should be installed at the lower end of the deflector to minimize erosion in the area that receives the diverted water. The spacing of the water deflectors depends on the grade (also called "slope" or "steepness") of the road. As the grade of the road increases, so does the frequency of water deflectors in the road. (See table below.) Keep in mind that different sections of road can have different slopes.

Grade of Road (%) (*slope or steepness*)	Water deflector spacing (feet)
2	250
5	135
10	80
15	60
20	45
25	40
30	35
40	30

In terms of maintenance, it is recommended to periodically inspect your water deflectors for damage as well as a buildup of soil behind the deflector. To keep the deflectors working properly, remove any accumulated soil collected against the deflector with a hand shovel every spring and fall.

(Continued from page 8)

Tillage and planting

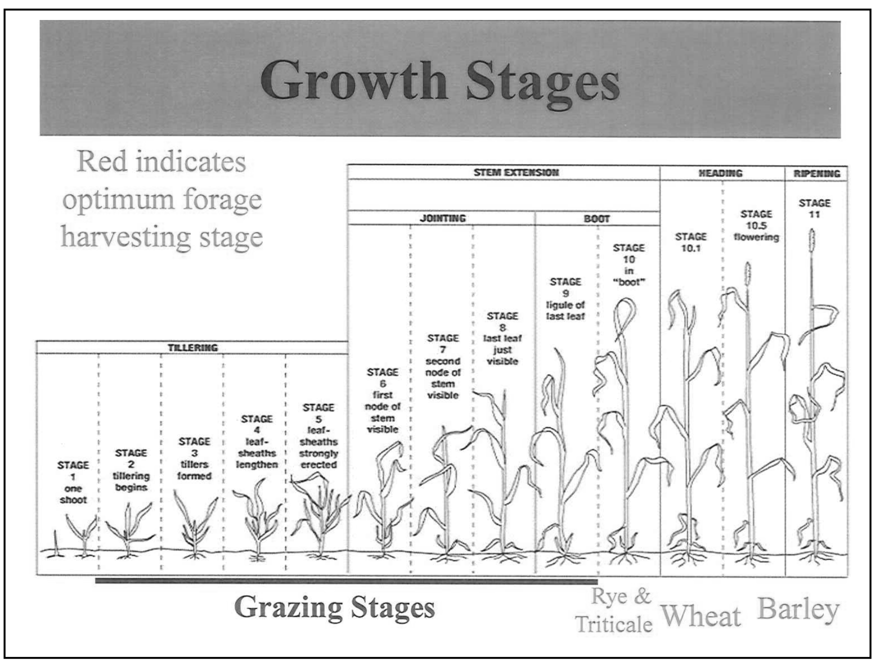
All small grains germinate well in a conventionally tilled seed bed, and planted using a grain drill. Oats, and especially winter rye (the hardiest and most aggressive small grain), will do very well broadcast, lightly incorporated, and rolled. Plant seeds at a depth of 1 inch but not deeper than 1.5 inches. Planting of spring grains for summer forage can occur from late March through late May. For grazing, a later planting date will push first grazing into late June-July, better timed with slump of perennial pastures. Summer plantings of spring grains (oats) for fall forage can occur in late July through the end of August. Winter grains are planted in the fall from mid August - mid September. Later plantings will not provide substantial fall growth and may survive the winter or perform well the following spring.

Variety:

There are many varieties of certified oats, with many seed companies offering "forage oat" varieties that produce more forage growth, and are excellent choices. Feed oats can be used successfully but may contain more weed seed. There are few certified winter rye varieties. Many winter rye seed is listed as "variety not stated" (VNS). Both certified and VNS ryes are reliably winter hardy and have done well on farms in this region. There are many winter and spring triticale varieties available; select one suitable to our area. Winter triticale has not proven to be as winter hardy in our area and therefore may not be a good choice especially for higher elevations.

Seeding Rate:

When seeded alone (not with perennial forage seedings), we recommend seeding small grains at a 3 bushel per acre rate (~100 lbs/acre for oats; 170 lbs/acre for rye/triticale) to maximize forage yield through high plant density. We don't recommend using small grains as companion crops for a summer seedings because they provide too much competition to allow the perennial forage to get well established before winter. Perennial seedings done with summer seeded small grains will have little if any chance for regrowth after cutting of the small grain, which will most likely be in October. This would leave them with a weakened root system, resulting in winter kill. For small grains used as companion crops for perennial seedings in spring seedings, cut the small grain seeding rates in half. In any circumstance, winter rye is not recommended as a companion crop due to known allelopathic affects on other seedlings and aggressive growth.



Fertility:

Soil test fields and apply lime, phosphorus, potassium, and/or magnesium as needed. Oats and winter rye do well at a soil pH between 5.8-6.5. Triticale prefers a soil pH of over 6.0. Manure can usually provide the phosphorus and potash needs of a small grain crop. Plan ahead though; wet fields in the spring may not allow for manure spreading traffic to apply the manure. A plowed down sod can provide all the nitrogen need for a small grain as will manure applied at a rate of 10-20 tons per acre. Fields that have had little manure or were in corn for more than two years wil require about 50 lbs of N per acre as fertilizer for the grain crop. An exception is for witner grains with multiple harvests (grazing) the next spring. These may need an additional 30-50 lbs N per acre after the first harvest for grazing.

Harvest:

Harvest can occur at any point that is deemed practical. Winter grain will benefit from grazing in the fall, as it will cause the plants to tiller and thicken the stand. Do not leave 10+ inches of growth to over winter with winter grains as it may cause disease problem, especially with triticale. Summer seeded spring grains will die over winter. In spring, small grains should be grazed before they reach boot stage to ensure regrowth. Once small grains head out, forage quality drops and they will not regrow after harvest. You can reasonably expect 0.5-2.0 tons per acre of dry matter yield, depending on the weather and time of year. If harvested for silage (chopped or baleage), try to get forage at least to 35% dry matter. Small grains can be very wet and if not dried properly, can result in poor fermentation (including clostridia dominated fermentation).

Cornell University
Cooperative Extension
South Central New York Dairy & Field Crops Team

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Building Strong and Vibrant New York Communities

CALENDAR OF EVENTS

JULY 31-AUG 2 — **MEXICAN CONSULATE to Visit Geneva:** Geneva Community Center, 160 Carter Road, Geneva, NY. The Mexican Consulate will be visiting Geneva on July 31, August 1 & 2 to provide consular services to the Mexican citizens residing in upstate New York who are in need of a Passport or Consular ID Card for identification matters, travel purposes, or to prove their Mexican nationality. They will also be assisting people in documenting dual citizenship. The consulate is providing this service to ease the burden of traveling to NY City to renew and obtain important documents. Identification documents also ease the process of opening a bank account, getting a tax payer ID number, and establishing dual citizenship if needed. Appointments will be available on Thursday (July 31) between 2- 7 PM and on Friday and Saturday (August 1-2) from 9AM to 2PM, please call 1-877-639-4835. Will be in the Upstate area on September 30-October 4, 2014- Syracuse, NY (location to be determined).

AUG 4 — **PRE-EMPIRE FARM DAYS TOUR:** PRO-DAIRY will host a tour of Walnut Ridge Dairy in Lansing, NY, Cornell University's new dairy processing plant in Ithaca, NY and the new Cornell Dairy Research Center in Harford, NY. A bus will be provided to minimize traffic on the dairies and lunch will be served on the Cornell campus prior to the tour of the dairy processing plant. Cost of the tour is $40 per person and pre-registration is requested; for more information and to register go to the PRO-DAIRY webpage at http://www.ansci.cornell.edu/prodairy/ and the "Save the Date" section.

AUG 5, 6 & 7 — **EMPIRE FARM DAYS:** Rodman Lott & Sons Farm, Seneca Falls.

Dairy Profit Seminar Topics:

Tuesday, August ***5*** 9:30 am – How to avoid losing a dollar per cow every day
10:30 am - Finding the next 10 lbs
1:00 pm – Management and genetics of sound feet and legs in the dairy herd

Wednesday, August 6 9:30 am – It takes a vision to leave a legacy
10:30 am - Maximizing the pregnancy rate in your herd
1:30 pm – Junior Dairy Leader Graduation

Thursday, August 7 9:30 am –A review of mycotoxins and their impact on dairy cattle production and health
10:30 am - What we've learned about shredlage

Read details here: http://www.ansci.cornell.edu/prodairy/e-Leader.html.

AUG 9 — **17TH ANNUAL FARM CITY DAY**: Fouts Farm, 1393 State Rte 222, Groton NY. 11 am – 4 pm. Fun, family event. For more information go to: http://ccetompkins.org/agriculture/events/farm-city-day.

AUG 10 — **SUNDAES ON THE FARM:** Hamley Family Farm, Barton NY. Noon to 3:00 pm. More details on page 4.

HOPFEST:

SEPT 12 — **PAIRED BEER DINNER AT:** Kenwood and Vine, Oneida.

SEPT 13 — **HOPFEST:** 435 Main Street, Oneida. 11 am – 5:30 pm. Guest speakers, vendors, beersampling and taste of hops. For complete 2-day program and registration go to: www.madisonhopfest.org or 1-315-363-4136. Some events have fees. Sponsored by the Madison County Historical Society.

OCT 28, 30 NOV 4, 6 — **CALF CARE WORKSHOPS:** 6:30 pm – 9 pm. Location to be announced. More details on page 6.