Capital Area Ag Report
August 8, 2013

“Plans are nothing. Planning is everything.”
— Dwight D. Eisenhower

Announcements

DAIRY TOUR
Dutch Hollow Jerseys—Chittenden family
Wednesday, August 14, 1 to 3 pm
101 Running Creek Rd., town of Kinderhook
• High-quality milk marketed in unique ways.
• Family partners in a Jersey herd focused on breeding
• Market high-quality milk to local name-brand processors
• Experience at fostering good neighbor relations

PLEASE BE PROMPT
Please RSVP so we have enough materials & refreshments for you. Contact Katie Close (kec98@cornell.edu, 518-925-5806) or Aaron Gabriel (adg12@cornell.edu, 518-380-1496).
Weather Data—August 8, 2013

I am sorry that I could not organize the weather together for this issue.

Wednesday, August 21st, at 1pm to 2:30 pm—Monthly Pasture Walk at Paul Wais, 479 Farm to Market Rd., Athens. Managing pastures in August; Pasture renovation; Preparing for Frost Seeding; Extending the Grazing Season. No charge, but please contact Aaron Gabriel (518-380-1496, adg12@cornell.edu) for a head count.

Tuesday, September 10, 1 – 3 pm, Field Meeting - Soybean Integrated Pest Management - at Stone House Farm, 3169 Route 9, Hudson. Learn to identify and manage pre-harvest soybean insects, weeds, and disease. Led by Ken Wise, CCE IPM Specialist & Aaron Gabriel, CCE Agronomist. 2 pesticide re-certification credits. No charge, but please call for a head count, Aaron Gabriel, 518-380-1496, adg12@cornell.edu.

FYI:
A Eurasian boar bill passed the assembly and the senate and now awaits the Governor's signature. It could be signed as early as this week.

As soon as the bill is signed it will be illegal to import, allow to breed or introduce Eurasian boars to the wild. There is a provision that if someone has a contract to import boars, dated prior to the signing of the law, they can import them for up to 60 days after the date of the signing.

Eurasian boars can continue to be possessed until September 1, 2015 at which time possession, sale, trade, transport, etc. of live Eurasian boars will be illegal.

You can read the full text of the bill at: http://assembly.state.ny.us/leg/?default_fld=&bn=S05733&term=2013&Summary=Y&Text=Y
Corn: No real change in the crop. Pollination looks good on the corn that I have seen, and I think throughout the area. It is getting dry in Schenectady County and through the region. I did see one hot spot of corn rootworm. There was more than 1 beetle per corn plant. Growing crops is expensive. If you can take the time to look at your fields and determine exactly what they need: insect pressure, weeds present, diseases, soil health, nitrogen needs—then you can tailor your inputs to what is needed and not spend extra.

I am seeing a very low number of northern corn leaf blight lesions. There are many races to NCLB. So your hybrid may be listed as resistant, but be sure to look at each hybrid in the field to ensure that they are resistant to the races of the disease in your field.

Soybeans: Yields are made in August. We do not want any stresses—water, insects, or diseases. In the reproductive stages, beans can only tolerate 20% defoliation and 250 aphids per plant.

Grasses: Grasses are growing slowly because it has swung back to being dry. As long as there is some moisture, fertilization will force growth and increase yield.

Alfalfa: Late-summer and fall alfalfa harvest is a tricky decision. The plants need 500 growing degree days (usually more than seven weeks in the late-summer/fall) between the last two cuttings to replenish root reserves. And you do not want more than 200 GDD to accumulate after the last cutting, or root reserves will be used up. What does this mean for your decision making? The first week of September typically is not a good time to harvest alfalfa. If fields are less than healthy, be extra conservative on how you harvest them. See Jerry Cherney’s article at the end of this issue.

Pastures: Pasture growth has slowed. For a healthy pasture, do not wear out grasses by continually grazing them close. However, if you want to frost seed a pasture this winter, then weaken the existing stand by repeated close and frequent grazing. This will give the new seed a better chance to establish in the spring. Frost seeding works best with red and ladino clovers, and is less successful with grasses. Among the grasses the ryegrasses work best followed by orchardgrass.
Alfalfa Fall Harvest Guidelines in NY – Should They Change?
J.H. Cherney, D.J.R. Cherney, and P.R. Peterson, Cornell University

Fall harvest management is one of the factors affecting the ability of alfalfa to overwinter successfully. Other factors include the age of the stand, the winter hardiness and disease ratings of the cultivar, the length of cutting intervals throughout the season, soil pH, soil K level, soil drainage, and whether growth is left to catch snow. Once we have planted a stand of alfalfa or alfalfa-grass, the primary two persistence factors we can control are soil K level and fall cutting management.

Good Old Days
For a number of decades, the policy for alfalfa fall harvest was to insist on a no-cut fall rest period of 4-6 weeks before the first killing frost. This critical fall period allowed root reserves to be replenished and minimized the chances that cutting management would negatively impact overwintering. Adequate time to replenish root reserves was considered 10% bloom by some researchers, while others assumed that 8-10° of top growth in the fall assured maximum root reserve storage, prior to the first killing frost. It also left significant alfalfa residue to facilitate insulating snow catch.

What is a “Killing Frost”? 
The temperature at which alfalfa essentially stops all growth is somewhere between 24 and 28° F. Sheaffer (MN) suggested the first killing frost was 28° F, Tesar (MI) considered it 26.6° F (-3° C), while Undersander (WI) considered a killing frost as 4 or more hours at 24° F. Other studies have used 25° F as the definition of first killing frost. This can greatly impact the date of “first killing frost”. In Ithaca, NY for example, the latest “first killing frost” date for 30 years of weather data occurred Nov. 5 at 28° F vs. Dec. 10 at 25° F. When accumulating Growing Degree Days (GDD) until first killing frost, a low temperature such as 25° F is not reasonable, as all alfalfa varieties with appropriate winter hardiness ratings for the region would have gone dormant well before Dec. 10.

Fall Alfalfa Harvest Management, 1980’s
During the 1980’s, numerous studies in Canada and the northern USA investigated alfalfa fall harvest management. Research in southern Saskatchewan found that a third cut between Aug. 25 and Sep. 20 reduced spring yields, compared to an Oct. 1 cut. McKenzie et al. (1980) determined that a second cut from Aug. to mid-Sep. consistently reduced future yields in central Alberta, but not in northern Alberta. In Minnesota, Marten (1980) concluded that a third harvest anytime in September would not reduce persistence, assuming it was a winter hardy variety on well-drained soils high in K, and there was consistent snow cover. In Michigan, Tesar (1981) also concluded that a third cut in September or early October was not harmful.
Tesar and Yager (1985) suggested that a third cut in September in the northern USA was not harmful as long as there was adequate time for replenishment of carbohydrate reserves between the second and third cuttings. Sheaffer et al. (1986) concluded that fall cutting does increase the risk of long-term stand loss, but that fall cutting will provide short-term higher yields and high quality. They also concluded that length of harvest interval and number of harvests during the growing season were as important as the final harvest date.

**Root Reserves Assessed with GDD**

The first attempt to quantify carbohydrate reserves between second and third cuttings of alfalfa based on GDD occurred in Canada. Research in Quebec by Belanger et al. showed that it may be acceptable to cut during the critical fall rest period in September, as long as there was an interval of approximately 500 GDD (base 5°C) between the fall harvest and the previous harvest. For forage crops in the USA, GDD are calculated using base41, with heat units accumulated above a daily average of 41°F (5°C). These do not generate the same number of GDD units, 500 GDD base_5°C is equal to 900 GDD base_41°F.

**Current NY Guidelines**

The sum of the above research results caused NY fall alfalfa harvest recommendations to change about 20 years ago to “Allow a rest period of 6 to 7 weeks between the last two cuts”. A similar recommendation in PA of “At least 45 days between the last two cuts” was also adopted. This recommendation has not changed in NY for the past 20 years. Keep in mind that any cutting management options during the critical fall rest period must involve healthy stands of better adapted winter hardy varieties with multiple pest resistance.

**Application of the 500 GDD Criteria**

A comparison of the Quebec 500 GDD base_5°C rest period can be made with the currently recommended “6-7 week rest period”. By selecting the years with the least and most GDD accumulated during August and September, a range in days for the rest period can be calculated, based on a 500 GDD interval between the last two cuts (Fig. 1 & 2). If cutting on Sep. 1, the 500 GDD interval prior to Sep. 1 is about 5 weeks (Table 1). If cutting Sep. 30, the 500 GDD interval prior to Sep. 30 is 6 to 7 weeks. The rate of decline in GDD units per day in the fall is similar for central and northern NY (Fig. 3 & 4; Table 1).

All X- and Y-axis date combinations below the shaded boxes in Fig. 1 and 2 identify the rest period interval that will result in 500 GDD before the September cut with high confidence. These date combinations resulted in 500 GDD for all 30 years of weather data. All X- and Y-axis date combinations above the shaded box in Fig. 1 and 2 will be very unlikely to accumulate 500 GDD, as this never happened in 30 years. For example, in Ithaca (Fig. 1) if alfalfa is cut on Aug. 2, it is Sept. 12 before you are out of the rest period shaded zone. Using the 500 GDD concept, our current 6-7 week rest period is appropriate for cutting at the end of September, but could be
reduced to approximately a 5 week rest period if cutting Sep. 1. For rest periods based on GDD, the later it is in the season, the longer it will take to accumulate 500 GDD (Fig. 3 & 4).

**Applying the 500 GDD Interval to the Critical Fall Rest Period before 1st Frost**

It has been suggested to apply the Quebec research to the period preceding 1st frost, and help define a “no-cut” time interval prior to 1st frost. The assumptions are that we need 500 GDD (base 5 C) for alfalfa to build up root reserves. A second assumption is that it is safe to cut alfalfa if there are less than 200 GDD (base 5 C) remaining before the first killing frost, as there would be insufficient regrowth to use up enough storage carbohydrates to negatively affect alfalfa persistence. We are presenting this system as an example, even though we were not able to find any evidence in the scientific literature concerning the 200 GDD assumption. A similar example of this concept can be found in Michigan literature ([http://www.agweather.geo.msu.edu/agwx/articles/article-09.html](http://www.agweather.geo.msu.edu/agwx/articles/article-09.html)), although GDD base 41 were used for this example incorrectly. Using the 500/200 GDD criteria, we can approximate the odds that fall mowing will not cause winter injury.

Approximate probabilities of either accumulating over 500 GDD (base 5 C) or accumulating less than 200 GDD (base 5 C), with long-term weather data (30 consecutive years) can be calculated if alfalfa is cut on a particular date in the fall at a particular site (Fig. 5 & 6). Four dates can be determined to approximate 0 and 100% chances of either more than 500 GDD after fall cutting, or less than 200 GDD after fall cutting. For this exercise, we are assuming that the first occurrence of 28° F is a “killing frost”. A killing frost in Watertown occurs on average 9 days earlier than in Ithaca (Table 1).

Four dates, (a,b,c,d, Fig. 5 & 6) are identified by calculating the following:

a. Year with earliest killing frost date: subtract 500 GDD base 5 C (from Sep. 20, 1993).
c. Year with latest killing frost date: subtract 500 GDD base 5 C (from Oct. 28, 2001).
d. Year with killing frost date: subtract 200 GDD base 5 C (from Sep. 20, 1993).

For long term weather data, these dates correspond to:

a. Latest calendar date resulting in >500 GDD base 5 C after fall cutting.
b. Earliest calendar date resulting in <200 GDD base 5 C after fall cutting.
c. Earliest calendar date resulting in <500 GDD base 5 C after fall cutting.
d. Latest calendar date resulting in >200 GDD base 5 C after fall cutting.

To simplify the display, we then assume a linear relationship between 0% and 100% chances that fall cutting will not cause winter injury. Statistical probabilities could be calculated individually for each day, but the results would not provide clear guidelines. The rate of GDD accumulation into the fall gradually decreases and is not perfectly linear (Fig. 3 & 4), but for practical purposes
a linear display suffices. Cutting on Aug. 31, Sep. 1, or Sep. 2, the odds of either accumulating >500 GDD or accumulating <200 GDD in Watertown, NY are approximately zero. Using this system, the date that would maximize the chances of winter injury due to cutting is Sep. 1 in Watertown, and Sep. 6 in Ithaca.

Comparing the Systems
Compare Fig. 4 (interval to 1st frost) to Fig. 2 (interval between last two cuts). If alfalfa was mowed on July 25, and then mowed again on Sep. 1 in Watertown, the chances of winter injury due to cutting are near zero for Fig. 2 (with 500 GDD accumulated between the last two cuts all 30 years). So under one system (Fig. 4), Sep. 1 would be the worst date to cut alfalfa in Watertown, while under the other system (Fig. 2), Sep. 1 can be a very safe date to cut alfalfa.

It is possible that both systems are reasonable. Allowing a 500 GDD interval before a Sep. 1 cut would make a Sep. 1 cut relatively safe. On the other hand, not allowing 500 GDD before a Sep. 1 cut might make this the worst possible time to cut an alfalfa stand. Keep in mind that winter damage to alfalfa is an accumulation of insults. A weakened stand will be considerably more susceptible to damage from intensive harvest management, as well as mowing during the critical fall rest period.

Reasons to be more Conservative in NY vs. the Midwest
There are several issues more specific to the Northeast/New England, which will likely have an impact on the chances of fall cutting affecting long-term alfalfa persistence. The basic requirement for any cutting of alfalfa during the critical fall period is that near ideal conditions exist. That is, you have a healthy, very winter hardy variety with high soil K, good soil drainage, and good snow cover over the winter. Good soil drainage in NY is often not the case, and consistent snow cover is never guaranteed. In northern NY there is also the possibility of alfalfa snout beetle and/or brown root rot damage, which could greatly affect the consequences of cutting during the fall period.

Reasons to be less Conservative in NY vs. the Midwest
Another NY-specific issue is that of species mixtures. Most alfalfa in the Midwest is sown in pure stands, over 85% of alfalfa sown in NY is in mixture with perennial grasses. For mixed stands with alfalfa, growers may be somewhat less risk averse than with pure stands, when it comes to the chances that fall cutting will result in shortened persistence of the alfalfa component. Loosing alfalfa more quickly from a mixed stand is not quite as catastrophic as loosing alfalfa in a pure stand. With the availability of Round-up Ready alfalfa, the frequency of pure alfalfa stands in the Midwest is likely to increase. Because NY has few prime alfalfa soils, it is less likely that RR-alfalfa will greatly increase the proportion of pure alfalfa stands in NY.
Conclusions
Our historical understanding of alfalfa root reserves provides evidence for maintaining a Critical Fall Rest Period for alfalfa. Applying the 500 GDD criteria to the Critical Fall Rest Period, however, results in an average rest period before 1st killing frost exceeding 7 weeks. Past research data provide evidence that a sufficient rest interval between the last two cuts allows us to take the last cut during the critical rest period. There does not appear to be evidence to change our basic logic for fall harvest of alfalfa. Some fine tuning of the rest interval between the last two cuts can be made using Fig. 1 and 2. The above suggestions are for healthy stands. If a stand is not healthy, a more conservative harvest management may increase the chances of stand survival.

Table 1. Ithaca (central NY) vs. Watertown (northern NY), 30 years of weather data.

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<thead>
<tr>
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<th>Ithaca</th>
<th>Watertown</th>
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<tbody>
<tr>
<td>Range in 1st 28°F frost date</td>
<td>Sep. 29 – Nov. 5</td>
<td>Sep. 20 – Oct. 28</td>
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<tr>
<td>Average date of 1st frost</td>
<td>Oct. 16</td>
<td>Oct. 7</td>
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<tr>
<td>Decline in GDD units/day from August 1 to Oct. 31 (GDD base: C)</td>
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<tr>
<td>Linear decline per day in GDD</td>
<td>-0.16</td>
<td>-0.16</td>
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<tr>
<td>Critical Rest Period before 1st frost (500 GDD base: C interval)</td>
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<tr>
<td>30 year Range</td>
<td>6.3 to 9.0 weeks</td>
<td>5.3 to 8.2 weeks</td>
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<tr>
<td>Average Critical Rest Period</td>
<td>7.6 weeks</td>
<td>6.8 weeks</td>
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<tr>
<td>Average Rest Period between last two cuts (500 GDD base: C interval)</td>
<td></td>
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<tr>
<td>If last cut is on Sep. 1</td>
<td>4.6 weeks</td>
<td>5.0 weeks</td>
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<tr>
<td>If last cut is on Sep. 15</td>
<td>5.3 weeks</td>
<td>5.6 weeks</td>
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<tr>
<td>If last cut is on Sep. 30</td>
<td>6 weeks</td>
<td>6.3 weeks</td>
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<tr>
<td>If last cut is on Oct. 15</td>
<td>6.7 weeks</td>
<td>6.9 weeks</td>
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<tr>
<td>Rest Period to guarantee 500 GDD between last two cuts</td>
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<tr>
<td>If last cut is on Sep. 1</td>
<td>5.1 weeks</td>
<td>5.3 weeks</td>
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<tr>
<td>If last cut is on Sep. 15</td>
<td>5.9 weeks</td>
<td>6.1 weeks</td>
</tr>
<tr>
<td>If last cut is on Sep. 30</td>
<td>6.6 weeks</td>
<td>7.0 weeks</td>
</tr>
<tr>
<td>If last cut is on Oct. 15</td>
<td>7.3 weeks</td>
<td>7.6 weeks</td>
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Figure 1. Range in rest period between September cut and previous cut to accumulate 500 GDD base 5 C (or 900 GDD base 41 F) for Ithaca, NY. Based on 1982-2011 weather data.

Figure 2. Range in rest period between September cut and previous cut to accumulate 500 GDD base 5 C (or 900 GDD base 41 F) for Watertown, NY. Based on 1982-2011 weather data.
Figure 3. Accumulation of GDD units (base, °C) per day between August and October for Ithaca, NY. Averages of 1982-2011 GDD weather data.

Figure 4. Accumulation of GDD units (base, °C) per day between August and October for Watertown, NY. Averages of 1982-2011 GDD weather data.
Figure 5. Approximate chances that fall cutting will not cause winter injury to alfalfa in Ithaca, NY. Based on 1982-2011 weather data and GDD base C (500 and 200 equivalent to 900 and 360 GDD base41 F). This is based on killing frost dates considered as the first 28°F temperature.

Figure 6. Approximate chances that fall cutting will not cause winter injury to alfalfa in Watertown, NY. Based on 1982-2011 weather data and GDD base C (500 and 200 equivalent to 900 and 360 GDD base41 F). This is based on killing frost dates considered as the first 28°F temperature.