Have Corn Rootworms Found a Way to Fight Back against Bt?

By: Mike Stanyard

The larva of the western corn rootworm (CRW) is a major pest that feeds on the developing roots of corn. CRW only feeds on corn roots and puts continuous corn rotations at high risk when large populations of larvae are present. Traditionally, CRW management was accomplished through crop rotation away from corn or through the application of a soil insecticide at planting. In 2003, Monsanto became the first company to sell Bt rootworm-resistant hybrids on the market. The plant cells contain a protein which kills CRW when ingested. Other seed companies have followed with different proteins (both Bt and vegetative) for the management of CRW. CRW management with Bt corn has been successful and refuge requirements have been put in place in case resistant individuals ever emerged in the field population.

Possible Problems in the Midwest

This growing season the effectiveness of Bt as a management tool has come under some scrutiny in the Midwest. University researchers in Iowa and Illinois were getting reports of Bt fields that were suffering from high levels of root damage from CRW. In both cases, the corn hybrids contained Monsanto’s Cry3Bb1 gene and the producers were using this same CRW protection the last three seasons. By the end of 2011, portions of four Midwestern states had observed increased feeding damage in Bt corn hybrids.

The “R” Word

Researchers at the University of Iowa recently published a paper, “Field-Evolved Resistance to Bt Maize by Western Corn Rootworm,” http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0022629. This is the first report of field-evolved resistance to a Bt toxin by western corn rootworm or any beetle species. Resistance to Bt in the insect world is not a new event.

Continue on page 3
Mission Statement

The NWNY Dairy, Livestock & Field Crops team will provide lifelong education to the people of the agricultural community to assist them in achieving their goals. Through education programs & opportunities, the NWNY Team seeks to build producers’ capacities to:

♦ Enhance the profitability of their business
♦ Practice environmental stewardship
♦ Enhance employee & family well-being in a safe work environment
♦ Provide safe, healthful agricultural products
♦ Provide leadership for enhancing relationships between agricultural sector, neighbors & the general public.
Many species have been induced to develop Bt resistance in the lab under controlled feeding and breeding conditions. However, examples of resistance under natural field conditions are very rare. If you place enough selection pressure on an insect population over time it will usually adapt.

**A More Integrated Approach**
The possibility of losing a great tool in the management of CRW is scary. A resistance management approach in conjunction with sufficient refuge acres is a keystone to this program. Remember, crop rotation to a non-host crop after corn is still a viable practice for CRW management here in NY. If you are in a continuous corn situation and are concerned about the Bt hybrid that you have been consistently planting, you have other options.

- Plant a hybrid with a different Bt toxin
- Plant a stacked hybrid with two Bt toxins
- Put down a soil insecticide at planting
- Use a high rate of a seed treatment for CRW control

Dr. Elson Shields, Cornell entomologist, will be discussing what this could mean for NY corn producers at Corn Congress in January.

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Colostrum, more than just IgG

By: Jackson Wright

In bovines, the placental membranes prevent the transfer of maternal immunoglobulins (IgG) to the calf. Immunoglobulins are critical to immunity and as a result the calf relies on colostrum to obtain immunoglobulins and subsequent protection from disease. This acquisition of immunoglobulins through colostrum is known as passive transfer or passive immunity. Conventionally, feeding high quality colostrum to calves as soon as possible after birth has been stressed to ensure a successful passive transfer; however, colostrum also provides the calf with high quality nutrition, beneficial growth factors and hormones, fluid, and warmth.

Colostrum is different from milk as it contains a mixture of both lacteal secretions and proteins found in blood serum. Colostrum production is under hormonal control and is influenced by estrogen, progesterone, corticosteroids, growth hormones, and prolactin. During late gestation high levels of estrogen and progesterone initiate colostrum production. At parturition, the spike in corticosteroids and drop in progesterone facilitate the transition to normal milk production. In general, the first six milkings after parturition are considered colostrum due to differences in milk composition.

These differences in milk composition include higher levels of protein, fat, carbohydrates, vitamins and minerals. In addition, high levels of fat and lactose provide the energy necessary for the calf to regulate its own body temperature. This is critical, as research has suggested that without this energy source calves’ fat stores would only last about 18 hours. Moreover, colostrum represents the first time the newborn calf will obtain nutrients through digestion instead of from the placenta or maternal blood supply. In addition to energy, the high levels of vitamins and minerals in colostrum may be necessary to initiate the calf’s metabolism and facilitate the development of its own digestive system. More interestingly, researchers have discovered that colostrum contains high levels of numerous growth hormones which include insulin-like growth factor I (IGF-I) and insulin-like growth factor II (IGF-II), epidermal growth factor (EGF), transforming growth factor (TGF), insulin, cortisol, relaxin and thyroxine. Most notably IGF-I and II have been shown to be important for both mammary development and maturation of the digestive system, and may influence the long-term thrust and performance of the animal. Finally, because colostrum is fluid this helps hydrate the neonate and the warmth helps the calf overcome the initial shock of entering the world.

Combined, these factors show how high quality colostrum is more than just IgGs and feeding this first meal as soon as possible following parturition can influence the long-term thrust of the animal and improve performance as she transitions into the lactating herd.

Colostrum, more than just IgG
Group Housed & Fed Dairy Calves – Cost Summary & Analysis For Four Dairy Farms

Contributors: J. Hanchar, J. Karszes, J. Petzen and members from four NYS dairies.

Messages

- Results from four dairy farms suggest that adopters of group housed and fed dairy calf systems realize labor cost and other labor factor efficiencies for the wet calves group through efforts to substitute capital for labor.
- While adopters realize labor cost and other labor factor efficiencies for the birth to weaning group, other costs, including building, machinery and equipment ownership, and operating costs tend to be greater for group housed and fed systems when compared to hutch systems.
- Overall costs of raising an animal from birth to weaning are fairly similar for dairy farms having high quality dairy replacement programs using hutches and the four farms using group housed and fed systems for calves on milk.
- For farms feeding waste milk, feed costs are very sensitive to the price assigned to waste milk.

A More Labor Friendly System

On December 1, 2011, a sold-out crowd of about 275 dairy farmers and their advisors gathered in East Syracuse to learn why some farmers are enthusiastic about group-housing and feeding systems.

Frans Vokey, Cornell Cooperative Extension stated, “Word has spread that group-housed calf systems may afford dairy producers the opportunity to make calf rearing more enjoyable and rewarding and at the same time be better for the business.”

“I love calves but this system put the joy back into raising calves,” said Mary Kelly, Kelly Farms, who participated on a producer/veterinarian panel. That is how Mary summarized her remarks after describing her experiences with a hutch versus group housed and fed system. Mary Kelly’s description of caring for calves in a hutch system, which included references to wearing multiple layers of clothing, and standing in front of a sink cleaning buckets for hours, was in stark contrast to her description of the current group housed and fed system that brought desired changes in lifestyle, and renewed joy and enthusiasm for raising calves.

Farm owners and calf managers are excited about raising calves in group housed and fed systems, because of the potential labor savings and more favorable work environment. However, potential adopters likely wonder about possible tradeoffs. These systems require initial capital investments in buildings, machinery and equipment that approach $150,000 for facilities designed to house about 8 animals per pen in 10 pens. Likely questions include:

- I expect labor costs to decline, but how much can I expect building, machinery and equipment ownership, and operating costs to increase?
- How will other costs change, for example, feed costs, and what will be the expected costs of raising a calf from birth to weaning?

Approach

Cost summary and analysis for the birth to weaning group for four dairy farms help to answer the above questions. Prominent features of the approach to develop cost summary and analysis for the birth to weaning group follow.

- Enterprise cost summary and analysis, birth to weaning calves
- Variable (operating) and fixed (ownership) costs
- MS Excel spreadsheet “Dairy Replacement Enterprise Analysis” developed by Karszes, Cornell University
- Data based upon
  ◦ tracking by four farm cooperators for various lengths of time in November 2011
  ◦ farm financial records
  ◦ estimates
Farm Descriptions

Farm 1
Group housed and fed calves, about 50 in number, are weaned at about 7 weeks at about 170 pounds. Facility consists of a calf area, housing 8 to 10 calves per pen, and an attached milk room. A continuously circulating, low line system delivers acidified salable milk and milk replacer to pens.

Farm 2
Calves are group housed and fed in numbers and facilities similar to above. A continuously circulating, high pipeline delivers acidified milk replacer to pens.

Farm 3
Acidified milk is available ad lib from plastic barrels through milk bars in a retrofit housing system with up to 20 calves per pen. Waste milk and some salable milk are fed. Waste milk is valued at $326 per ton based upon a cost of production estimating approach.

Farm 4
Calves are housed, up to 25 per pen, in a relatively new group housing system with a central utility room, and fed via a mechanized feeding system. Waste milk, some salable milk, and some milk replacer are fed. Waste milk is valued at $326 per ton based upon a cost of production estimating approach.

Karszes and others
Values reported here represent average values for 17 NY dairy farms where December 2007 prices were adjusted to November 2011 using farmer prices paid indices. The 17 farms had above average numbers of dairy cows, and high quality dairy replacement programs. Birth to weaning aged calves were raised predominately in calf hutch.

Results
Notable results for labor cost and other labor factor efficiencies include the following:

- For the group housed system farms, Farms 1 through 4, labor costs per animal completing range from $34 to $60. This range of costs is less than the average cost for hutch system farms described as “Karszes and others” of about $84 per animal completing.

- Notable results for building ownership, feed, other and total costs include the following.
  - Building ownership costs of $41 and $29 per animal completing for Farms 1 and 2, respectively, are greater than the average cost of $14 for hutch systems. Group housed system Farms 3 and 4 realize costs of $12 and $8, respectively, and appear to benefit from spreading building ownership costs over more calves.
  - Feed costs for Farms 1 through 4 range from $167 to $186 per animal completing. This range is somewhat higher than the hutch farms’ average cost of $151, possibly reflecting greater feed consumption.
  - Feed costs reported for Farms 3 and 4 are very sensitive to the value, price assigned to waste milk.
  - Total costs for raising calves from birth to weaning for the group housed and fed system farms range from $280 to $339 per animal completing, and compare favorably to the total costs of $319 for the farms with high quality, hutch system dairy replacement programs.

To learn more about this topic visit the team’s website at <nwnyteam.org> and click on “AgFocus
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Let’s take a look into the crystal ball of beef as we enter the New Year. Cattle numbers are generally on a 10-year swing, with the herd size to swing upwards in 2015. We are at an all-time low with numbers.

As with any look into the future of agriculture, Mother Nature has her input. Last year and 2010 saw severe droughts in the southern plains states with Texas hardest hit. USDA/NASS estimated cow numbers were down 0.5% in 2011 and predicted to decline 3.9% in 2012, and continue to decline in 2013 by 2.8%. There may be one more year of drought conditions due to La Nina weather patterns. These number declines mean fewer calves next year, and the year after.

Feed prices are partly to blame for declining numbers. Corn prices shot up for 2011 with a small decline as 2011 wanes (December 9). Price per head to feed out cattle rose $80 between January and October. Modified distillers and hay went up as well. Corn prices are predicted up in the spring. Price paid for feeders went up early in the year as supply dwindled. Many feedlot owners purchased stockers (500-600 lbs) early, fed them on available pasture prior to sending to their feedlots at 700-800 lbs.

Another prediction is corn acreage for 2012. The USDA predicts record acreage will get planted, the largest in world history. A high supply should bring the price down.

World demand for beef is at an all-time high. For the first time in history, the U.S. exported more beef than was imported. This was due to increased exports of low end cuts and grind to Mexico and increased exports of high end cuts to Japan and South Korea. With Japan raising age restrictions on age at slaughter to 30 months, this should further improve the export market for the U.S.

The trend is for beef prices to continue to rise. Price cycles are usually 5 years and we are currently 2 years into a high-price swing. Much of this upward cycle will weigh on our economy as well as the European Union. Time will be the judge if we see a double-dip in the recession.

For the first time, the retail market is driving wholesale prices nationally. Wal-Mart moved to promote Choice over Select cuts, they say in response to their consumers. The price spread has risen to $0.20 per lb, predicted to stabilize between that and $0.12. The consumer is looking for a high quality product for the flavor experience.

It will take time to build the cow herd back up. So, here in NY we should be sittin’ pretty. We have 3 million acres of idle land that could be used for pasture. Marginal land is better suited for pasture than crop production. Our temperate climate is well suited to receive adequate rainfall for pasture and other crops.

So, will you grow your herd, or start a herd? Pencil it out. If yes, genetic selection is critical. If you are looking at the commodity market, marbling is the key. Choose your cows and bulls wisely. Carcass ultrasounding may be an important tool to assist with herd development. Local markets continue to grow as well.

Much of this information came from a webinar (online seminar) I heard with Dr. Shane Ellis. Shane is from Iowa State and will be at this year’s NY Beef Producers Association’s Feeders Conference January 20 in Syracuse. See elsewhere for the complete agenda for Friday and the Annual Meeting on Saturday the 21st. Both days look to be great educational opportunities.
In farming, we have ups and downs; good years and bad. Weather, prices, the general economy and consumer attitudes can affect the bottom line for farm businesses. Sometimes we feel there are few things we can control that affect the financial performance of farm businesses. For a farm manager, the first step toward taking control is understanding the financial position of the business. Preparing financial statements can help you to evaluate the financial side of the business and determine a plan for monitoring and controlling financial performance.

The Balance Sheet

The balance sheet or statement of owner’s equity uses a stock concept to summarize the financial position of a business at a given point in time. The balance sheet details the assets and liabilities of the farm business. The balance sheet equation, “Assets minus liabilities equals owner’s equity,” shows the relationship between the assets of the business and the liabilities it is carrying. Owner’s equity is what would remain in the event the business was liquidated and all the debts paid at the point in time the statement was prepared.

A balance sheet is prepared in a standard format. This format is used to organize the assets according to the ease of converting each group of assets into cash and liabilities of the business according to the time required for repayment of each type of debt.

Once a business has prepared a balance sheet, ratios can be used to gauge the solvency and liquidity of the business. One can evaluate the solvency or liquidity of an individual business over time or compare it to industry standards using ratios. Solvency measures the long term financial stability of a business. The ability of the business to service its debt in the short run is gauged by liquidity indicators.

Solvency ratios

**Debt to asset** ratio shows the amount of debt the business is carrying for every dollar invested in the business. It is calculated by dividing the total debt by the total assets.

\[
\text{Total debt ÷ Total assets} = \text{Debt to asset ratio}
\]

A debt to asset ratio of .30 means the business has thirty cents of debt for every dollar of assets it owns. This is a very stable business from a solvency perspective. If the debt to asset ratio climbs above .60, a business becomes more financially vulnerable. In this solvency situation, businesses generally have less financial flexibility to withstand a downturn in prices, a disease outbreak or crop failure.

The **percent net worth** quantifies the share of the assets an owner could expect to realize if the business were sold. Calculating percent net worth is a two-step process. First subtract total debt from total assets to determine the amount of net worth or owner’s equity. Then divide the owner’s equity by the total assets.

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<tr>
<th>Harvest Farms, Balance Sheet</th>
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<td>December 31, 2011</td>
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<tr>
<th>Current Assets</th>
<th>Current Liabilities</th>
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<tr>
<td>Cash</td>
<td>Accounts Payable</td>
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<td>Accounts Receivable</td>
<td>Operating Lines of Credit</td>
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<td>Stock</td>
<td>Current Portion of Inter. &amp; Long T. Liabilities</td>
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<td>Inventory and Supplies</td>
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<th>Intermediate Assets</th>
<th>Intermediate Liabilities</th>
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<td>Breeding Livestock</td>
<td>Term debt with maturity less than 10 years</td>
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<td>Machinery, Equipment, Vehicles</td>
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<th>Long Term Assets</th>
<th>Long Term Liabilities</th>
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<tr>
<td>Land &amp; Buildings</td>
<td>Term debt with maturity greater than 10 years</td>
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<th>Total Assets</th>
<th>Total Liabilities</th>
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<td>Net Worth</td>
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By Joan Sinclair Petzen
Step 1:  Total assets – Total liabilities = Net worth

Step 2:  Net worth (also called owner’s equity) ÷ Total assets x 100 = Percent net worth or equity

When the percent net worth is 40%, the owners of the business would have forty cents left after all the debts were paid if it were sold out on the day the balance sheet was prepared. A business in this financial position needs to think about reducing debt to improve its financial flexibility. If the percent net worth is greater than 70%, the business is considered to be financially sound from a solvency perspective.

**Liquidity ratios**

Liquidity measures the ability of a business to meet its financial obligations in the short run. Current assets are readily converted to cash. Current liabilities must be paid within one year of the date the statement was prepared.

The **current ratio** shows the value of current assets available to service each dollar of current liabilities. It is calculated by dividing the current assets by the current liabilities.

\[
\frac{\text{Current Assets}}{\text{Current Liabilities}} = \text{Current Ratio}
\]

A current ratio equal to one means there is exactly one dollar of current assets available to meet each dollar of current liabilities.

**Working capital** is a measure of the quickly available capital to meet short term obligations. It is the absolute value of liquid assets left after the current liabilities are met. It is calculated by subtracting the current liabilities from the current assets.

\[
\text{Current Assets} – \text{Current Liabilities} = \text{Working Capital}
\]

Using the balance sheet, an owner can capture a financial snapshot of the business. This statement helps gauge the financial stability of the business both in the short and long run. A balance sheet is typically prepared at the end of each year. In agriculture, where cash is often short, comparing the balance sheet from the beginning and end of the year can help a farm owner to evaluate the change in the financial position of the business. Ratios are used to help understand the relationship between assets and liabilities both in the long and short run.

This article is the first in a series of three articles being prepared by the author to help farm managers become more familiar with the essential financial statements for managing a business.
Corn Congress 2012

Corn Seeding Rates: Do they Interact with Hybrid Selection or N Rate? Bill Cox, Cornell Agronomist

Leaf Blights & Ear Molds: Review of 2011 Gary Bergstrom, Cornell Plant Pathologist

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Bt Resistant Rootworms: Are they coming to NY? Elson Shields, Cornell Entomologist

Recognizing Low-Level Herbicide Resistance, Dandelion Management in Zone-Tillage Corn, & More Russ Hahn Cornell Weed Scientist

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→ Records, Protocols & Tracking Tools
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Pesticide Ed I

February 14
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Pesticide Ed II

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19  Finger Lakes Corn Congress, Holiday Inn, 2468 Route 414, Waterloo
20-21 NY Beef Producers Annual Mtg., Embassy Suites Hotel, 6646 Old Collamer Road, E. Syracuse, For more information contact: Brenda Bippert: 716.902.4305 or Mike Baker: 607.255.5923
26  NY Corn & Soybean Expo, 8:30 a.m. - 3:30 p.m., Holiday Inn, 441 Electronics Parkway, Liverpool, Registration: juliacrobbins@gmail.com

February 2012
8  WNY Soybean/Small Grains Congress, Clarion Inn, 8250 Park Road, Batavia
9  Finger Lakes Soybean/Small Grains Congress, Holiday Inn, 2468 Route 414, Waterloo
21  Step It Up Winter Grazing Conference, BW’s, 11070 Perry Rd., Pavilion, Contact: Nancy Glazier: 585.315.7746

REMINDER….

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⇒ Nutrient Management: March 13, 15, 20 & 22
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